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BULLETIN No. 20

THE RAILWAY AND LOCOMOTIVE
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BULLETIN No. 20

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311 Eleventh St., Raymond, Washington.

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In presenting this bulletin to our members, we are calling your attention that this is the usual issue published the latter part of the year. The notes on the early Tram roads as presented by Messrs. Bishop and Barrie hark back to the earliest days of transportation. We are reproducing again another interesting contribution of the late J. Snowden Bell in his description of the Baltimore & Ohio No. 600. The trip over the Charleston & Hamburg R. R. in 1833 gives one an idea of the mode of transportation at that early period. As the result of much research the list of early English engines that came to this country is reproduced herewith and we hope that it will fulfill its purpose. Mr. Stuart has allowed us to reproduce two more interesting letters and the trip to Richmond shortly after the war will be of interest to us all. The original of the letter from H. W. Nelson, Sup't. to Conductor J. J. Floyd is in the Baker Library. This is one of the earliest and one of the most unique letters of its kind and has been reproduced for our members. The account of the "Stourbridge Lion" and Rainhill Trials, the one hundredth anniversary of each recently celebrated, has been well covered by Mr. Loye.

Bulletin No. 19, as many of you are aware, was devoted to the story of the growth of the Michigan Central R. R. It was an experiment and the bulletin has met with a cordial reception, judging from the replies that have been received, though the majority of our members have not voiced their opinions. Accordingly the first bulletin that will appear next year will cover in the same way, but more fully, the Philadelphia, Wilmington & Baltimore R. R., but because of the cost of publishing it, this bulletin will not be included with those mailed to our members in 1930. The two regular bulletins will appear during the year and will be mailed to our Annual Members. You will be notified of the appearance of the Philadelphia, Wilmington & Baltimore R. R. bulletin and given the opportunity to subscribe to it, if you wish. Meanwhile, as stated in Bulletin No. 19, expressions of opinion are in order, for those who have not been heard from.

A new arrangement has been effected at the Baker Library for admission to our rooms. Instead of showing credentials to the watchman of the building, our members and guests should now proceed to the Delivery Desk on the second floor where arrangement will be made for admission upon showing of your credentials.

Our cover design was drawn by Mr. E. Andre Schefer, our artist, and shows Baltimore & Ohio No. 217, one of Ross Winan's "camels", with a string of old time equipment.

One of our members is anxious to secure data concerning a locomotive named "N. A. Whitamore". This was a Laird engine, sent to Massachusetts in 1854 to a contractor named Whitamore who was engaged in building some road in Massachusetts at that time. It is believed that this engine went to the Central Ohio R. R. and retained under another name but do any of our members recall or have any knowledge of this engine and what road in Massachusetts it was used on? If so, will you please advise the Editor.

1829— Centenary of Rainhill, the "Rocket" —1929 and the "Stourbridge Lion"

By John Loye.

This year of 1929 is one of notable anniversaries, among them being two of primary interest to students of early railroad history. One marks the centenary of the arrival in America of the "Stourbridge Lion"; the other the centenary of the definite perfecting of the steam locomotive by George Stephenson. We feel, therefore, that the year should not be allowed to expire without due notice being taken of them.

The name of the "Stourbridge Lion" is destined to remain forever like a shining beacon at the very beginning of the story of the American railroad. The "Lion" was not the first locomotive in America, it is true, being antedated by that of Stevens, 1825, and, maybe, by Peter Cooper's first experimental engine, although 1830 is the date assigned to it, as a rule. There was also Strickland's working model, brought from England in 1826, Johnson's steam carriage, which appeared on the streets of Philadelphia in 1828, and James' steam carriage in Liverpool the same year. But all of these locomotives were but imperfect and experimental machines with little or no commercial possibilities.

The "Stourbridge Lion" was, as described in "Watson's Annals of Philadelphia," "the first locomotive that ever turned a wheel on a railroad track in America." It was one of four engines which the Delaware & Hudson Canal Company ordered from English builders in 1828. The first delivery was the "America," which reached New York in January, 1829.

The Mystery of the "America"

Why the "America" was never used by the D. & H. Co. remains a mystery. According to Horatio Allen, under whose instructions the engines were ordered to be built, this engine and its companions were practical in every way, and built on the principles then adopted by the builders, the Stephensons, of Newcastle-upon-Tyne; that is, they had tubular boilers, and the driving rods were direct to the wheels from the cylinders, which latter were set high above the firebox at about 35°. The drive was on the leading wheels, and these were connected to the rear wheels by coupling rods, the machines being carried on two

pairs of wheels not above 4′-0″ diameter. These engines embodied the principles which made for the success of their family relation, the famous "Rocket," whose triumph at Rainhill in the same year, 1829, definitely established the complete success of the steam locomotive, and the fame of their builder, George Stephenson. It seems manifest that they would have proved as practicable as the "Rocket" if they only had been put to the test. We doubt, however, that the "America" had a multi-tubular boiler like that of the "Rocket", as authorities agree that the latter was the first locomotive built in England with a boiler of this type.

For a reason never explained, the "America" and her companions were destined to remain unclaimed in a warehouse in New York until sold for their metal weight. But to them must go the honor of being the first practical locomotives seen in the new world, of which the first to arrive was the "America."

The "Stourbridge Lion"

When Horatio Allen visited England in 1828, he was commissioned by the Delaware & Hudson Canal Co. to order locomotives which were, in his opinion, of the highest practical design. At that time two types of locomotive boiler were competing for favor with British railway engineers, the tubular and the flue. The latter was of two classes, flue and return-flue. The plain or straight flue boiler was little else than a tubular one in principle, since the flues were several large tubes traversing the boiler from the fire-box to the smoke-chamber. This type of boiler proved to be an effective steamer within certain limits and had won the approval of leading mechanical engineers. It struck a medium between the return-flue and the multi-tubular; was a better steamer than the former, and supposedly, equal to the latter in this respect and easier to construct. The boiler of the "Stourbridge Lion" had five flues, or tubes, passing through the water-space.

There was also competition at the time between two schools of practical mechanics as applied in the transmission of power from the cylinder to the drive-wheel. The one still adhered to the indirect method, derived from Watt's stationary engines of the vertical cylinder and the cross-beam. The other had been previously employed by Hackworth in the "Royal George", 1827, with a vertical cylinder.

Foster, Rastrick & Co., of Stourbridge, were exponents of

the straight flue boiler and the cross-beam drive, while the Stephensons adopted the multi-tubular boiler and the direct drive. Mr. Allen elected to try both types of locomotive, representing as they did, the highest practice of the time, and so ordered the "America" from the Stephensons, and the "Stourbridge Lion" from Foster, Rastrick & Co.

Stourbridge Lion Unsuccessful

The Stourbridge engine was delivered at New York in May, 1829, and appears to have remained there for some time. It was not until August the 9th, following, that it was tried upon the Honesdale & Carbondale line with Horatio Allen at the throttle. Why this engine failed has never been clearly explained, no more than the reason why it was elected for trial and the "America" never tried at all. Now, one hundred years after the time, it seems to us that circumstances combined against the "Lion," and that its failure was due to mismanagement rather than to defective construction. In addition, the working conditions on the Honesdale line were, we may justly assume, rough and primitive, and injurious to an engine intended for a smooth and level railway, and especially an engine of the cross-beam type. We imagine that the "America" would have been more successful in the circumstances because of its direct drive and, probably, greater steaming capacity.

But the first venture in the use of regular locomotives in America was destined to fail, whatever may have been the cause. To the Delaware & Hudson Railroad belongs the honor of association with their name, the "America" and the "Stourbridge Lion," the first practical railroad locomotives to appear in the western hemisphere.

America's Interest in the Rainhill Trials

Mr. Allen was, it was understood, commissioned to order four engines in England. He, we can suppose, like his British contemporaries, was still unsatisfied with the locomotives of the time, which were close to being perfected, but, as yet, imperfect. Possibly, the experiments to be made at Rainhill prompted him to wait on their result. The announcement of the Liverpool & Manchester Railway that it would award £500 to whomsoever could produce a locomotive to fill all requirements specified, gripped the minds of American railroad promotors, and, in fact,

the whole engineering world of the time, and all seemed to realize that out of the competition that was forthcoming the perfect locomotive would emerge. That it would be a competition between the leading exponents of the tubular and the flue boilers was apparent. The great desideratum of the day was a locomotive boiler that could make steam with a rapidity proportionate to the expenditure of its cylinders at high speed, and under heavy working conditions. Such a boiler had not, as yet, been produced.

Mr. Rastrick, designer of the "Stourbridge Lion," was appointed to judge of the entries at the famous trials. George Stephenson, designer of the "America," was to be a competitor, and Timothy Hackworth, who followed the ideas of Rastrick, was to be another. It will thus be seen how intimately related were America's first locomotives to those that made history at Rainhill one hundred years ago, and the close bearing of Stephenson's success upon subsequent locomotive design and construction in America.

Stephenson's Triumph

The story of the Rainhill experiments is too long to be recounted in detail. Sufficient for us to say that George Stephenson triumphed, and that the world at once realized that a power had been created that was due to revolutionize the long established order of land transport, and commercial, economic and social development. But a word should be said of Stephenson, and the engine that is linked inseparably to his name, the "Rocket."

The success of the "Rocket", however, definitely turned the course of development to the railway for general transportation.

George Stephenson is often referred to as the inventor of the steam locomotive. This is untrue. He was the perfector of the locomotive, however, even as Edison was the perfector of the incandescent light just fifty years ago. Stephenson did not invent or construct the first locomotive. Neither did Edison invent or produce the first bulb light. But each in his own sphere took that which was crude and inadequate, and evolved from it that which was absolutely perfect, and on this pedestal rests their everlasting fame.

Perfection in Combination

The steam locomotive was evolved rather than invented. It was the ultimate combination of the ideas of different experimentors that obtained a perfect working engine. These ideas, as combined in the "Rocket," were the steam-blast, the multi-tubular boiler, and the direct driving rod. To these we may add the inclined cylinder. Richard Trevethick employed the steam blast in 1804. Seguin, Neville, Stevens, Read and Betancour had introduced the multi-tubular boiler, and this idea had even occurred to Watt as early as 1784. Murdoch employed the direct drive in 1784, as did also Cugnot, in a way, in 1769. But these ideas remained almost as separate as the men until Stephenson combined them.

Stephenson's Ingenuity

Due tribute must be paid to George Stephenson's natural mechanical ingenuity, and to his ability to coordinate these various principles in his own productions. His own contribution, the inclined cylinder, was of great value, since it reduced the strain on the driving rod and piston by so avoiding the shock experienced when the drive wheel met a rise in the rail at the moment the piston was on the downward stroke. It also eased the motion of the locomotive in general, and eliminated friction to a high degree. Indeed, the combination of principles that attained to perfection, and achieved success for the "Rocket" at Rainhill in 1829, is exactly that of the locomotive of 1929. The latter may have enlarged greatly, and may have acquired certain improvements in its design and reciprocating parts, but after all, it is nothing more than a big "Rocket," relying for its power on the same essential combination of the multi-tubular boiler, the steam-blast, the direct drive, and the cylinders set in a position removed from the vertical. Try to change this fundamental arrangement and the steam locomotive will revert to the defective stage that preceded the day of Rainhill.

In conclusion be it said that the potential power of the steam locomotive which became so apparent to all observers a century ago, has long since surpassed the most extravagant dreams of that day. No other automatic machine produced by man has in turn produced so tremendous an effect upon the world. Sudden was the transition from slow transport by road

or river to rapid transit by rail, and great was the consequent acceleration of all industrial activity. The creation of a means of passage from city to city in a day where formerly it meant even a week's journey; the possibility of linking together the trading points of a vast continent, and making quick and easy communication between them possible; these were the potentialities that must have struck the minds of the farseeing men of 1829. The marvelous progress of the nineteenth century may be said to have been due in a greater measure to the influence of the locomotive than to any other potent factor. The United States of America is a monument to the locomotive and the minds that evolved and perfected it.

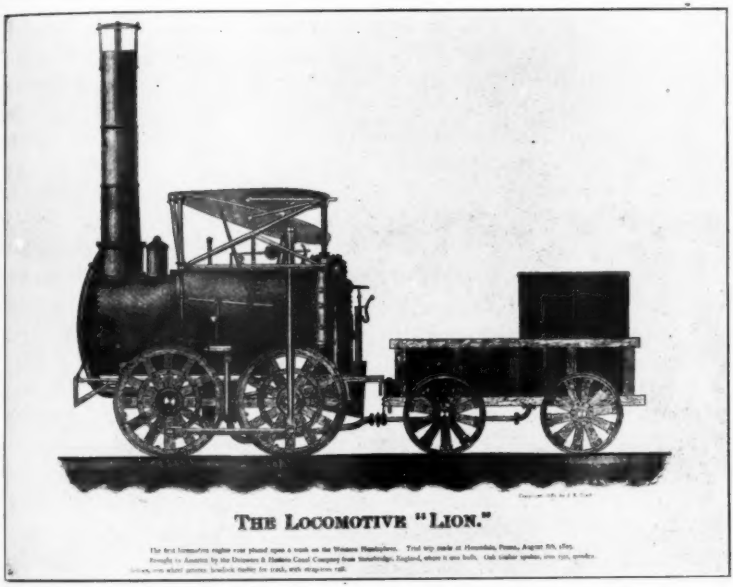
The railroad lines, like the stage-coach and wagon lines, will eventually pass from the face of the Earth, when aerial transit shall have relegated them to the obsolete. But the memory of the great trunk lines that reared this America of ours, and spread the carpet of our commonwealths over the plains of the wilderness, shall make the grandest passage in our story when told to the generations yet to be.

But to Rainhill and the "Rocket" we must turn again in this their centennial year, and recall how it was Stephenson's achievement in October of 1829 that gave stimulus and creative knowledge to a waiting world, and set in motion the gigantic power that has made America what it is to-day.

The Stourbridge Lion Centennial

On August 8th, 9th and 10th, of this year, there was held in Honesdale, Pennsylvania, a celebration commemorating the one hundredth anniversary of the trip of the "Stourbridge Lion."

Many of us will recall that this engine was built in 1828 by Foster, Rastrick & Co., England, and shipped to the Delaware & Hudson Canal Co. Under the guidance of Horatio Allen, this locomotive made its first trip from Honesdale to what is now Seelyville. The excessive weight of seven tons prevented further use of this engine and after its second trip this engine never ran again.



THE LOCOMOTIVE "LION."

The celebration was officially set in motion at 2 P. M. with the transportation parade. Beginning with the crude travois of the Indians, the ox-cart, stage coach, high wheel bicycles, early automobiles and on up to an air plane circling over the heads of the throng, the various steps of transportation were shown.

At 3.30 P. M., Mrs. R. D. Lewis, granddaughter of Horatio Allen, dedicated a monument erected on approximately the spot where the "Stourbridge Lion" began its famous trip, inscribed

as follows: "Near this site on August 8th, 1829, the "Stourbridge Lion" made its trial trip on the railroad of the Delaware and Hudson Canal Company with Horatio Allen as engineer. To commemorate that historic event this monument was erected by the citizens of Honesdale, Pennsylvania, August 8th, 1929." The speakers were the Honorable A. T. Searle, President Judge of Wayne County; Colonel J. T. Loree, Vice President and General Manager of the Delaware & Hudson Co.; the Honorable Samuel E. Shull, President Judge of Pike and Monroe counties; and the Honorable Harry A. Mackey, Mayor of Philadelphia.

In the evening, at the Stourbridge Lion School grounds, a pageant written and directed by Rev. William R. Newton was given. The theme of the pageant centered around the weaver "who weaves the web of years." The story ran from the pioneers who opened the territory, the coming of the railroad, the Civil War and the peace that followed.

On the second day the local industries and business houses entered floats which made an interesting parade and on the third day the fire departments of Honesdale, Carbondale and Scranton and nearby towns had a parade.

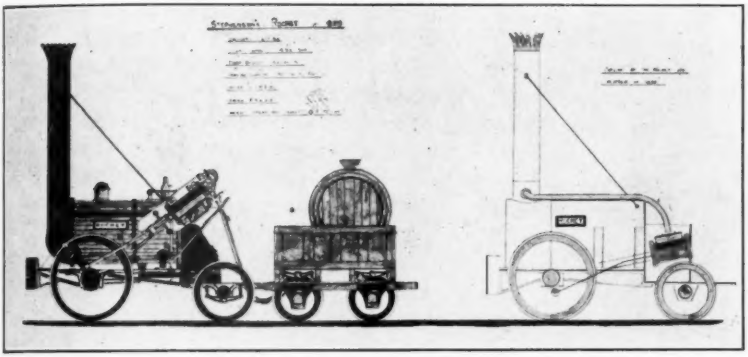
The Delaware & Hudson Co. placed on exhibition three of their latest locomotives, Numbers 652, 1117 and 1400 (named Horatio Allen). Representatives from the Motive Power Department were on hand to explain all the details of these machines.

From start to finish the parades, pageant and exhibits were presented in an orderly and picturesque manner and those who were responsible for this celebration deserve much credit for their efforts.

The Rainhill Trials

It was one hundred years ago, October, 1829, that these trials took place at Rainhill, just outside of Liverpool. Here the "Rocket," built by George Stephenson, demonstrated that it was superior to the other locomotive contestants and elevated the builder to a higher niche in the wall of fame.

The Rainhill trials were the result of the directors of the Liverpool & Manchester R. R. wishing to determine whether a stationary engine or a locomotive was the best means of propulsion for their trains. A price of £500 was offered to the builder who met their conditions—to draw twenty tons at the rate of ten miles an hour, boiler pressure not to exceed fifty pounds to



The original and rebuilt "Rocket" Drawn by J. W. Smith.

the square inch, to be equipped with two safety valves, one of them to be beyond the control of the engineer, to consume their own smoke and be not over fifteen feet high from the rail to the top of the chimney and their weight, with water, must not exceed six tons.

In Bulletin No. 12, Mr. John Duncan has given a very interesting account of the trials and tribulations that beset the builders of the Liverpool & Manchester R. R., as well as the doubt that existed in their minds as to the feasibility of the locomotive. As we read today, the arguments then used against the steam locomotive, it is difficult for us to believe that those people were in their right minds.

The trials began on October 6th and lasted through until the 14th. Stephenson's "Rocket" was painted yellow and black

with a white chimney. Braithwaite & Ericeson's "Novelty" was covered with copper like a "New Tea Urn" and presented a very "parlour-like appearance." Burstall's "Perseverance" had red wheels.

The throng, knowing nothing about locomotives, selected the "Novelty" as the favorite and Stephenson's "Rocket" was pronounced "ugly, clumsy and unmechanical." The burnished copper, good lines and the prodigious puffs of the "Novelty" were the deciding factors with the throng.

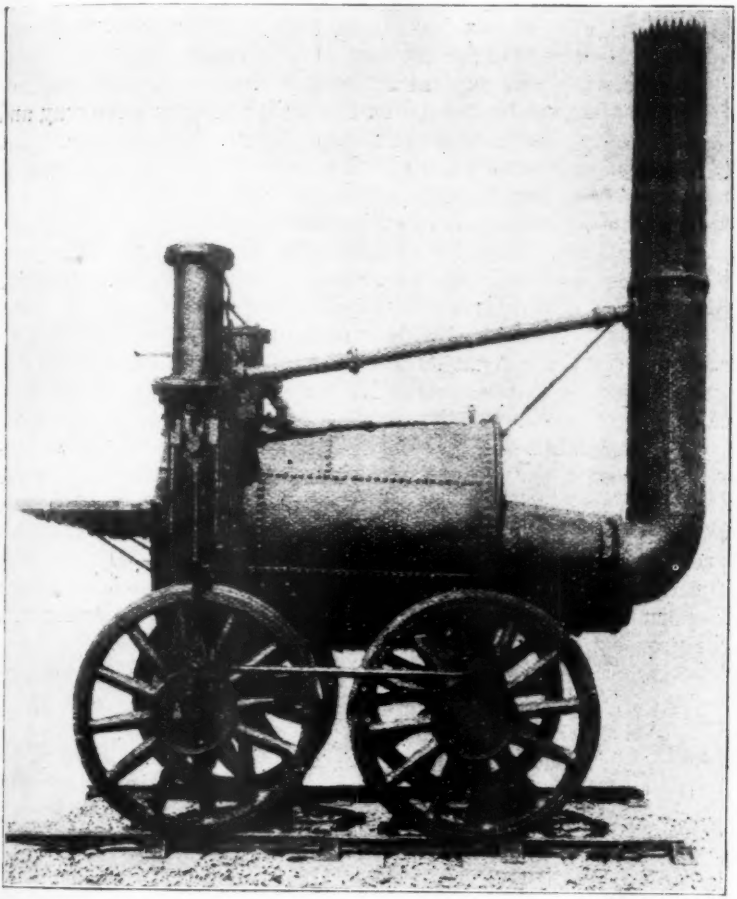
On the first day the "Rocket" ran up and down the track, hauled a load of twelve tons and nine hundred weight at more

George Stephenson

than the stipulated speed. The "Novelty" actually made a mile in one minute and fifty-three seconds when its turn came and on the second day handled a load of eleven tons and five hundred weight with ease at nearly twenty-one miles an hour. On account of a rain, the trials were postponed on the second day and in this interval the directors decided to stiffen the conditions. The engines were now to haul three times their own weight, carry enough fuel and water for thirty-five miles, and run up and down the course until they had completed seventy miles, time to be deducted for refueling and watering.

The "Rocket" was the first called for this ordeal. For the

first thirty-five miles, the engine ran at a speed of eleven miles an hour, used sixteen minutes for taking on a new supply of fuel and water and completed the second thirty-five miles as uneventfully as any locomotive of today would.



Hackworth's "Sanspareil"

On the fifth day the "Novelty" was again tried, and Braithwaite thinking it advisable to warm her up, ran the engine down the track. There was a hiss of steam and the engine stopped.

A small pipe had burst and although the trouble was soon repaired it was too late to travel the seventy miles. Next, the "Rocket," stripped came lumbering down the track and made thirty miles an hour on a seven mile run.

On the sixth day Hackworth's "Sanspareil" ran up and down the track for two hours and then the feed pipe burst and her career was ended for the day.

On the seventh day the "Novelty" again ran and the new cement which had been used on the boiler flanges gave way and the "Novelty" came to a dead stop. The "Perseverance" also ran but did not establish a speed of over five miles an hour and withdrew from the contest.

Stephenson every day had hauled a coach of twenty to forty people up Rainhill incline at twenty miles an hour. There was nothing for the directors to do but to award the £500 prize to George Stephenson and his "Rocket."

Stephenson had had wide experience and was a skilled engineer and for that reason the "Rocket" won. The firebox was surrounded by water so that little heat was wasted, the steam exhausted into the smoke stack, thereby increasing the draft and making a hot fire and lastly the power of the steam was exerted through the piston and connecting rods directly to the driving wheels without any intervening gears. Some of these George Stephenson invented and others he borrowed from his predecessors but it was the combination of them all that produced the result of making the "Rocket" the forerunner of our modern steam locomotive and placing Stephenson's name with the greatest of technical achievers.

Early Tramroads in Great Britain

By G. W. Bishop.

Whilst it cannot be stated when railways definitely began, or were invented, there are certain early events that help us to trace their evolution. At some dim and misty period the idea of two narrow tracks beneath the wheels of a vehicle took shape, and it seems that the Romans attempted something of the kind in their "Stone Roads," specimens of which are preserved in Leicester Museum. These also helped to establish a "standard gauge" for wheeled vehicles and trackways which came later.

Probably these ideas lay dormant until the need for easier transit of coal in Northumberland and Durham led to lines of wood being made, upon which horses could draw wagons of coal with greater ease. As early as 1555 one of these tramroads is said to have existed at Barnard Castle, the term arising from the "trams" or wooden beams of which they were made. Another theory traces the term to the "Outram road" constructed by Outram about 1775, but it is far more likely that "tramroads" were so called at an earlier date, as stated.

Originally the tramroads were merely lines of wooden slabs, upon which, one supposes, the wagons had to be guided by the skill of the driver. A marked improvement was then made by the use of raised strips or flanges, fastened to the wooden "trams," these flanges holding the wagons in position on the track.

These wooden lines soon wore away, and other improvements were the fixing of iron plates upon the beams, about 1738, and, later, the use of cast-iron flanged rails upon cross ties or sleepers. This was followed by the practice of linking wagons together in a primitive form of "train."

An important development took place in 1785, when William Jessop began to use flanged wheels upon plain rails of cast iron, thus shifting the flange from the rail to the wheel, and introducing the present day form of track. The rail was now becoming ready for the locomotive, the first engine to turn a wheel upon an iron rail being Trevithick's locomotive, at Merthyr Tydfil, South Wales, Feb. 13, 1804.

Numerous tramroads of the types mentioned existed in England, Wales and Scotland, one of them being as far West as the Isle of Skye. Traces of many have been lost, whilst others became absorbed into larger systems, such as the Sirhowy

Heytor Tramway, Dartmoor—From a Sketch by Mr. C. G. Harper

line in Wales, 28 miles long, which became part of the London & North Western Railway.

These rough and primitive tracks deserve some consideration, as they represent early experiments in the development of railways. They were the result of much thought and effort on the part of workers of the past, known or unknown, who thus played a worthy part in the history of transport by rail.

It may be fitting to mention here a curious old line that formed a kind of link between railways and tramways. This was the "Moreton Tramway," from Moreton-in-the-Marsh to Stratford-upon-Avon, originally proposed by William James, a noted pioneer, as part of a "Central Junction" scheme extending through the Midlands. The line from Moreton was surveyed in 1820, and built under the direction of Thomas Telford, being opened in 1826. The chairs for the track, also a weighbridge at Stratford, were apparently made by Foster & Rastrick of Stourbridge, but the rails came from Northumberland, and were of the fish-bellied type, in 15 ft. lengths, with stone sleepers. A passenger service was carried on by horse traction for some years; eventually the line became G. W. R. property, and that Company reconstructed part of it as a branch to Shipston-on-Stour. The remainder is now derelict, and it is understood that the brick bridge over the Avon at Stratford is to be removed, in consequence of alterations to the Clopton Bridge near by.

Mr. D. S. Barrie, of London, one of our English members, has kindly supplied the following notes on the subject of old tramroads in Wales and Scotland: "There is a tradition in my mother's family that my great-grandfather built several tramways in the early decades of the nineteenth century, from the valley coalpits of South Wales and Monmouthshire down to the rivers and canals. I was born near Newport, Mon., my grandfather being at one time manager of the Hennlys (?) Colliery above Cwmbran. When he left this job he struck out on his own and bought the Graigyddu claymine, near Pontypool, and also established brickworks at Risca, Mon., where my mother was born. These two works are still going full blast and are still owned by my mother's family, my father being in fact connected with them in his business.

The only purpose of my reciting this family history is that all these old mines have most interesting little tramway systems. That at Graigyddu is quite extensive, and consisted of two sections (1) a main line running back into the hills, underground,

for nearly a mile, with various branches, and (2) a steep incline about 1 in 10, worked by cables, leading up the mountain through dense woods to an old "outcrop" gallery which produced quite good coal for about 85 years; the coal is still there but it costs too much to get out.

These two tramways, which are about 2 ft. gauge, were both laid about 1830, I believe. The original sleepers were stone setts (as were commonly used at that time) and the rails cast-iron and flat-bottomed. My grandfather ripped the whole lot up when he bought the place, and since then the "permanent way" seems to have been relaid many times. It now consists of a mixture of various types, with light steel rails and sleepers predominating. The coal-mine section is of course disused, but the cables are still in situ. The clay-mine branch is worked, to the best of my knowledge, by an old horse, though on the occasion of my last visit I and my uncle (now managing director) "drove" one of the trains (two trucks loaded with clay weighing about five tons) along the underground gallery; the attempt had to be given up when I fell into a trench full of water!

The brickworks, or rather one of the three owned by our family, is situated in a very narrow, very steep valley which is thickly wooded on both sides. There is a Great Western single-line branch running up the valley to the well-known Tirpentyws Colliery at the top; the steepest gradient on this branch (worked by 0-6-0T standard gauge engines) is 1 in 18. There is a siding from the branch to the brickworks.

About 200 yards below the brickworks, buried in the woods, is a very interesting old railway relic which dates back over a hundred years. This is an old tramway leading to a cable-worked incline to the Tirpentwys pit, and was used for running coal down to the valley before the G. W. R. built their branch. The brick-built arches of an old bridge and a few pieces of old rail dating from about 1845 are still there, while one can trace the path of the track through the woods; the old incline is however, buried under refuse tipped down the side of the hill in more recent times.

The old tramway which my great-grandfather is supposed to have built is about four miles in length, and ran from the Bettwys-Hennlys colliery to Caerleon, where the coal was tipped into barges. The pit is located right on top of the mountain, and from it there ran an incline two miles long (double track, about 1 in 15) down to the valley level. This was of course cable-worked. On reaching the valley level the gradient eased out to

1 in 100 to 1 in 500, or thereabouts, and ran through fields to the mining town at Cwmbran (now a G. W. station). Thence it passed via Llantarnam and Ponthir (both now G. W. stations) to Caerleon. The lower section, from Cwmbran to Caerleon, was closed and abandoned as soon as the Great Western (old Monmouthshire Railway) reached Cwmbran; the upper section from the pit to Cwmbran remained in use and connection was made with the G. W. at Cwmbran. At some date of which I

Old Tramway Bridge, Stratford-Upon-Avon

have lost trace the pit ran out of coal and the whole thing became abandoned. The colliery is still there, though the old workings are flooded out, and a great chimney remains which can be seen from the main Newport-Hereford line of the G. W. R. The old incline is also still there, except that most of the rails have been removed; apparently there was a self-acting device half-way down, which enabled trains of wagons to pass one another. One short section between the foot of the incline and Cwmbran is in a really remarkable state of preservation. The rails and sleepers, mixed wood and stone, are still there, together with a number of old wrought-iron level crossing gates at points where the railway crossed the country lanes.

At Cwmbran connection was made with a now derelict steelworks, while traces of the old tramway can be seen in the streets. Apparently standard gauge wagons were worked over it, though

by what means is uncertain. The Cwmbran-Caerleon section runs parallel with the Great Western main line, though only at one or two points can traces of it be seen, in the shape of grass-covered embankments and some stone culverts above the River Afoullwyd (the spelling of these names is largely surmise!). Of course, there are traces of hundreds of tramways in County Durham, and the same holds good for the mining districts of South Wales and Monmouthshire; many of them were converted to standard gauge lines by the G. W. R.

I made a particular point of revisiting the Isle of Skye, where I last year observed a derelict railway. This time I was able to make a somewhat closer examination of this line, although unfortunately the severe weather prevented any photographs being taken. The line, which was apparently about 3 ft. gauge (permanent way has been taken up and no information is obtainable locally) ran from the village of Broadford, on the coast of the island, to another hamlet called Torran, about three miles inland. At Broadford are the remains of a pier, used for shipping the marble for which the line was built. There is also a stone viaduct of which only three broken stone piers remain. The line can be traced for the whole of its course. Leaving the pier it crosses the main island road on the level and strikes at once directly inland.

For the first quarter of a mile the old line can be traced passing through fields, on a rising gradient, until some now derelict and roofless buildings are reached. These apparently are crushing or other mills, though I am not sufficiently acquainted with marble quarrying to know what processes are involved. Passing beyond these derelict buildings all trace of civilization is lost, except for the cross-island road, the railway passing above this on the side of the hill. At some points the railroad, running due west, is only a few yards from the road, at others it is as much as half a mile distant. Some effort seems to have been made to preserve the grade, which is never more than about 1 in 70. For two miles the line skirts the hillside, nearly always in shallow cutting on one side and embankment on the other. The ground over which the road passes is sodden and peaty. After two miles Torran is reached. Here there is every indication of decayed industrialism; tumbledown cottages which housed the quarry workers, a number of buildings (one of which looks very much like a locomotive shed) and great gashes in the hill where once the stone was quarried. There is now no in-

habited dwelling and the whole place is very lonely and forbidding; there are extensive sidings at the quarries.

It is fairly reasonable to assume that at least one locomotive was used, since the line is three miles or so in length and the road-bed firm and well-built; while the general tendency is for the grade to fall with the descending loaded trains, empties only having to run against the grade, the haulage of heavy trains over this road in rough weather such as prevails in these parts must have been very heavy work for horses. The lay-out of sidings indicates that the traffic must at one time been heavy.

I meant to land on the Isle of Raasay, to inspect the derelict railway built in connection with the ironworks here, but did not do so for lack of time. I did, however, come across another old railway. This is really a tramway and must obviously have been worked by horses. It is located on the Macleod estate at Dunvegan Castle, Skye, and although I did not have time to walk over the whole of it, it must have been at least a mile long. Single track throughout, it runs from the main road at Dunvegan into the dense woods and was, or may be still, used for the transport of timber out in the said woods. The tramway consists entirely of wooden rails about 4 ft. apart laid on horizontal sleepers secured by cross-timbers. There is no metal in the permanent way at all except nails. Apparently when the timber-felling season is in progress, logs are worked over this primitive road from the logging camp by horses. It is not strictly a railway, since practically nothing has been done to level the grade, but it is nevertheless interesting." This concludes Mr. Barrie's notes.

By the courtesy of the Editor of "The Cyclists' Touring Club Gazette," the following extract from the issue of that journal for May, 1929, can be added: "A Granite Tramway.—On the jagged skyline of Dartmoor, seen plainly from so far away as Teignmouth Harbor in the south, are the bold rocks of Heytor, north of Newton Abbot. This is a place of much popular resort, on the side of the down are the remains of the granite tram lines laid down to convey the granite blocks for the rebuilding of London Bridge in 1831. These blocks were taken down by canal to Teigngrace and the River Teign and thence put on barges for Teignmouth Harbor, whence they were shipped to London."

This note was illustrated by a sketch by Mr. C. G. Harper, and by permission of the latter artist a copy of the sketch has been prepared by Mr. J. W. Smith, which is here reproduced.

Baltimore & Ohio R. R. No. 600

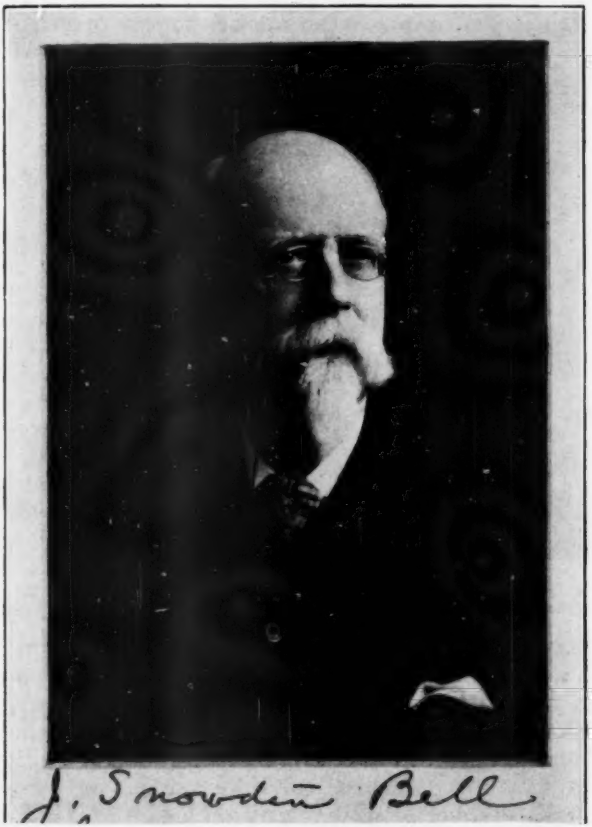
By J. Snowden Bell.

Through the kindness of Mr. Inglis Stuart, the attention of the Editor has been called to a letter written by Mr. Bell on August 26, 1876, addressed to the Editor of the "New York Tribune." As many of us will remember, this locomotive was on exhibition at Philadelphia in that year and the following are the impressions received by Mr. Bell.

"There is no department of the mechanic arts in which this country's progressive development is more marked and gratifying than in that of railroad machinery, and specially locomotive engineering. Boldness and originality of conception, supplemented by successful and practical constructions, have overcome natural difficulties, which in the early days of railroads, seemed insuperable. The crossing of mountain ranges by locomotive engines over grades of 120 feet to the mile, in the ordinary operation of trunk lines—an achievement proposed and accomplished by American engineers—has solved the nottiest problem of transportation, and has refuted the erroneous deductions of untried theory by the convincing argument of practical success. The requirement of the transportation of freight and passengers over heavy grades has led to the construction of American locomotives which combine the elements of power and speed, with simplicity of construction and economy of operation unexcelled, if equaled, by those of Europe.

"The exhibit of locomotive engines in the Exhibition, already a large and attractive one, has received an addition which possesses historic as well as mechanical interest in presenting a comparative view of our earliest and our most recent practice. The Baltimore & Ohio Railroad Company has sent to the exhibition their oldest engine, No. 6, and their newest, No. 600; and an engineer can view side by side the pigmy of 1835 and the giant of today. The old engine, with its upright boilers and cylinders, walking beams and gearing, has an air of antiquity in the eyes of those who are accustomed to the symmetrical proportions and imposing appearance of the standard American locomotive, and deserves a careful examination as well by the practical engineer as by the general observer, as evincing by comparison the improvements which have been developed in locomotive construction during the 41 years which have elapsed since it was built. The class of engines of which it is a speci-

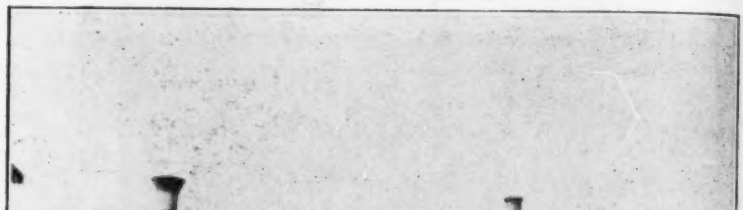
men was designed and constructed by Phineas Davis of York, Penn., to fulfill the requirements of the first proposal ever issued in the United States for locomotive engines. Following



Courtesy of the Railway Age.

the example of the Liverpool & Manchester Railway of England, which developed at the Rainhill Trial of 1829 the germ of the modern high-speed engine in Stephenson's "Rocket," the Baltimore & Ohio Railroad Company issued, on the 4th of January, 1831, an advertisement for a supply of locomotive engines of American manufacture, in which they offered to pay the sum of $4,000. for the most approved engine which should be delivered for trial upon their road on or before June 1, 1831, specifying

certain conditions, among which were that it should burn coal or coke, should not exceed 3½ tons weight, and should be capable of drawing, day by day, upon a level road, 15 tons, inclusive of the weight of the wagons, at the rate of 15 miles per hour. Four engines were produced in answer to this proposition, one of which, the "York," built by Davis & Gartner of York, Penn., and chiefly designed by Phineas Davis, was found to be able, after certain modification, to perform the prescribed duty, and



The B. & O. "York" #10, Davis, 1831, and the "Atlantic" #11, Davis & Gartner, 1832, as they appeared at "The Fair of the Iron Horse"

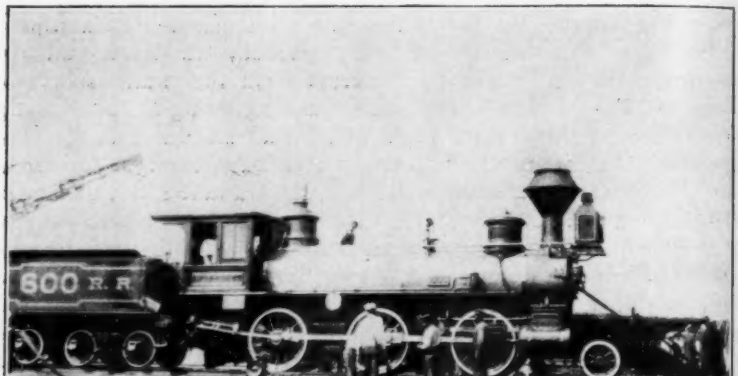
was accepted by the Company. This engine had an upright boiler and cylinders, but was connected without the interposition of gearing, being, in other respects, substantially on the plan of the exhibited engine No. 6. It is worthy of note that the design of the engine shows in all particulars novelty and originality, and shows that the builders had boldly struck out upon a new path, wholly distinct from that marked out by the English predecessors at Rainhill. The "York," with her light weight of 3½ tons, was deficient in adhesion, and was soon superseded by the "grasshopper" engines, of which No. 6 is a specimen. In the construction of these engines Mr. Davis was assisted by the veteran locomotive engineer, Ross Winans. Modern improvements have made these engines obsolete, but they have rendered long-continued and valuable service; engine No. 6 having been at work continuously from 1835 until she was sent to the Exhibition. Her weight is about 8 tons, carried upon four driving

wheels, 36 inches in diameter, rotated through a counter-shaft and spur gearing by a pair of vertical cylinders, 12½ inches in diameter and 22 inches stroke. The duty in which the engine has been employed for some years past consists in switching cars in the yard of the Mount Clare shops. Owing to her short wheel base she passes around the numerous short curves connecting the various tracks there with great ease.

"The engine No. 600 which has been selected as a representative of the practice of today, presents in detail and appearance, the most striking contrast with the diminutive machine of 1835. It is a heavy grade passenger-engine, possessing great tractive force with high speed, and embodies in its construction the distinctive features which have brought the modern American locomotive to its present standard of excellence. An English writer aptly states that 'civil engineers have proved that it is possible to construct a railway where a road practicable to mules or horses can be run; but where the work of the civil engineer ends that of the mechanical engineer begins, and he is called upon to produce machines which will not only work extremely difficult lines of railway, but perform their duties for a moderate outlay in fuel and maintenance with certainty and safety.' Such a problem was met and solved in the crossing of the Allegheny Mountains, by the Baltimore & Ohio Railroad, and No. '600' is a type of their recent and most approved machines for passenger service on the mountain grades. As early as June, 1848, Benjamin H. Latrobe, then Chief Engineer of the road, assisted by Jonathan Knight of Pennsylvania and John Child of Massachusetts, surveyed its lines across the Alleghenies, embracing a continuous grade of 116 feet per mile for a distance of 17 miles, upon which there are numerous curves of 600 feet radius. The engineers were satisfied that such a grade, which before that time had not been deemed within the power of a locomotive engine, could be practically and economically overcome without the employment of stationary power, and the experiment of 23 years has fully verified the correctness of their judgement and reflected lasting credit upon their boldness and independence of their design. The railway over the Semmering Alp from Vienna to Trieste, and the Pennsylvania Railroad were subsequently constructed with corresponding grades, and showed that Europe as well as America was not slow to approve and follow this innovation in railroad engineering. Before commencing the construction of the Semmering road the Aus-

trian Government sent its engineer to America to investigate the subject of steep gradients, and on his return the surveys were commenced and the present route selected.

"From the opening of the road in 1853 to the present time, this heavy grade has been regularly worked with economy and safety, the duty of passenger locomotives being to haul up a



B. & O. #600 as She Appeared at "The Fair of the Iron Horse"

train of four or more eight-wheeled cars at a speed of from 18 to 20 miles an hour. The first passenger engines employed were built from the design of Samuel J. Hayes, then Master of Machinery, and were ten-wheel engines weighing 60,000 pounds, and having six driving wheels 50 inches in diameter, and cylinders 19 by 22 inches. Their performance was satisfactory, but the increased demands of traffic caused them to be replaced by heavier engines of the same general type, but embodying improved features of design and detail, which were built in 1863-4 by Thatcher Perkins, who was at that time the head of the Machinery Department. The Perkins engines weighed about 72,000 pounds, and had 18 by 26 inch cylinders, and six driving wheels of five feet diameter. They were and are efficient and trustworthy machines, and are in constant use upon mail and express trains on the mountain grades. The continued increase of traffic, accompanied by increased weight of passenger and mail cars, finally rendered necessary the employment of an additional or helping engine upon each mail and express train; and with a

view to the reduction of working expenses, while keeping pace with the demands of transportation, Mr. John C. Davis, the present Master of Machinery, designed and built, in 1875, at the Mount Clare Shops of the Baltimore & Ohio Railroad Company, in Baltimore, the passenger engine '600,' which the Company sends to the exhibition as a representation of the progress of forty years. The engine is of the 'Mogul' type, now recognized as affording in an eminent degree the advantages of utilizing nearly all the weight for adhesion, while providing facilities for passing round short curves with ease and safety, and is the largest and most powerful engine of that class ever constructed for passenger train service. Her weight is 90,400 pounds, of which 76,550 pounds are upon six driving-wheels of 5 feet diameter, and 13,580 pounds on a two-wheeled swinging truck, the truck wheels being 31 inches in diameter. Both driving and truck wheels are provided with steel tires, secured by transverse hook-headed bolts. The boiler is double-riveted, and has a shell ⅜ of an inch in thickness, with steel firebox. It is of ample capacity, having a diameter of 50 inches, a furnace 9 feet by 3 feet, and 165 flues, 2¾ inches outside diameter and 11 feet 8⅞ inches long. The cylinders are 19 inches in diameter with 26 inches stroke, and are solidly connected with the frame, meeting in the center in the manner almost universally adopted by American builders. The boiler is supplied by two short-stroke pumps, worked by return cranks on the rear axle, and an injector is also provided. The details of the engine are in accordance with the most recent practice, and it is neatly finished, although but little brass or bright work is used except upon working parts, mere useless ornamentation being discarded. The engine is capable of handling a passenger train of six cars, including one Pullman car, up a grade of 116 feet a mile, at a speed of 18 miles an hour, without the assistance of a helper. In appearance and proportions it conveys even to those who are not familiar with the mechanism the idea of symmetry and solidity, while the practiced engineer will discern in the details the evidences of judicious application and excellent workmanship. The two engines occupy positions in front of the Maryland Building in the Exhibition grounds, and it is most appropriate that in an exhibition which displays to the world American progress in the arts should offer as an evidence of the development of the skill and genius of American artisans not only the perfected mechanism of the present, but also the efforts of the past."

Account of a Trip Over the Charleston & Hamburg R. R. Soon After Its Completion in October 1833

(From a History of Transportation in the Eastern Cotton Belt to 1860 by Ulrich B. Phillips)

Furnished by JAMES M. KIMBALL.

"A traveler from New England with journalistic talent, has left us a record of a trip over this Road, one of the first to be completed in the United States, made by him in the first month of its full operation—October 1833. At that time this was the longest R. R. in the country.

He writes: "The road consists of a single track with turnouts at various places. The rails of the track are built of the timber of the country,—hard pine full of pitch. In the wet and boggy places first are driven piles, ten feet, more or less, in the soil. Over these connecting timbers are placed; then cross timbers keep the connecting timbers at an equal distance from each other. On the ends of the cross timbers the rail timbers are placed; on the inner side of the upper surface the irons are nailed, all of them throughout being of the same width.

On the few excavated places that occur, the same construction exists, except that there are no piles, the connecting timbers in the former case lying hard upon the ground. The City of Charleston being on dead level, as well as the surrounding country for miles, there are excellent routes for Railroads. The expense of them is of course far less than at the North, where bridges are to be built, hills to be cut through, and the like. Indeed the expense of the whole of this road is said to be less than any one of the Northern railroads.

Before we started from Charleston, the engine (the Best Friend) was sent off for some distance to be tried. After the passengers had been detained some quarter-hour beyond the appointed time, they started at the rate of ten or twelve knots. The country, as far as the eye could see, was shaded with here and there a solitary live-oak, and woods of pitch pine. In a little while the speed of the engine began sensibly to diminish, and soon came to an end. The cause of this stoppage I was told was "want of steam." So after Sambo had been sent to pick up some brush and other procurable fuel, the engine began to

go again—like the Dutchman who while advancing in the march stopped to light his pipe, that he might attack the enemy under cover of the smoke!

At Woodstock the road seemed to vary in construction in no respect from the part at Charleston. The management of the engine was indeed wonderful. Now it went as if Satan were at its heels; now it scarcely dragged its freight. Several times it came to a dead stand, for want of steam. After continuing in the afternoon in the above manner—stopping, then going fast, then slow again—we arrived at two or three log houses, and one half built log "tavern" amid a burnt forest of pitch pine. Here was Blockville. A few fires glimmered on the ground; a square rough boarded fabric stood by the roadside, which was the "storehouse." Here was to be our tarrying place for the night. We had accomplished the wonderful distance of 90 miles from eight a. m. to 6:30 p. m. on a railroad, through a country with a hard soil, and not a hill rising twelve feet the whole journey. The whole country for one hundred miles from the sea coast is as level as your frog pond.

After warming ourselves we were shown into a room furnished with a few old chairs and a table. The food upon it was good; the cooking, probably that of slaves—miserable. After supper I went out and stood by the fire in the open air. At last, tired and fatigued, I applied for a couch to the landlord. There were, I believe, but five rooms, and twenty-five or thirty passengers were to share them. The landlord led me to a room containing three beds. The room was occupied by four—a New Yorker and a Georgian in one bed, a "raal tar" in the second, and myself in a third. The Georgians have naturally some of the best of hearts. Hence why a Yankee should be thought worthy of one's society. A south Carolinion would have shunned the New Yorker!

There being no appeal from this mode of sleeping, a submission seemed best. Five rooms were built, opening into one entry separate from each other by a boarded partition, of which the cracks were one inch only in width. Besides the partition did not extend to the top. The rooms very much resembled a row of stalls in a stable, open above. Anything said at one end could be heard at the other. In one of them several ladies slept. After having slept soundly, the bell rang, and "get up" was the watchword. Having dressed, the door to breakfast room opened. Of the latter I made no complaint except of its cook-

ing. The fee of $4.00 was paid and we started again. The road continued as before. The land grew uneven. Long and undulating hills appeared. Where these were cut through, the ground exactly resembled red brick dust. Here commenced the upland. Nearly one hundred miles had been one vast plain. The country grew more hilly until we reached Aiken, 120 miles from Charleston, where the car stopped, and our baggage was taken out and put into another car, to go down the inclined plane. The old car immediately returned to Charleston. The new one was let down the inclined plane by negroes. Its perpendicular descent might have been 200 feet, in a horizontal distance of 1200. On either side was a stand with railings. Two negroes on each stand turned a crank in its center. We soon began to go about five or six miles an hour.

The country became more hilly in our cruise. At 4 p. m. the car stopped at Hamburg, 136 miles from Charleston. Having been apprised of the fare—75 cents each, demanded by the stage for carrying passengers across Augusta bridge, I slipped a quarter into a negro's hand and walked on foot while he lugged my baggage to the United States Hotel in the city. The stage-driver seemed chagrined. The U. S. Hotel is a large airy building. The fare is $1.50 per day. The building, its furniture, the table, and the attendance are exactly the same quality as those of the Commercial at Boston, with this difference, that the servants are slaves, and the food much crisped in cooking. * * * Augusta is the finest city I have yet seen in the South. The streets are broad and fringed like those of Charleston with rows of China trees. Broad Street is about half a mile long."

The negro fireman Sambo mentioned in this story must have been the same one who went sky-ward with the boiler when the explosion wrecked the Best Friend. The first locomotive boiler explosion in America by the way!—J. M. K.

Description of the Inclined Planes on the C. & H. R. R. from the American Railroad Journal, Aug. 2, 1834

"The Charleston & Hamburg R. R. is the longest R. R. ever constructed. It rises 510 ft. from Charleston and then from this point, 16 miles from Hamburg descends 360 ft. to Augusta Bridge. There is an inclined plane of 3800 ft. in length and a descent of 180 ft. It has three grades of descent, the steepest of which is one in thirteen. From the foot of the plane the re-

mainder of the descent is overcome in ten miles with an average inclination of 18 ft. per mile. The road is a single track with necessary turn-outs, except at the inclined planes, where there is one mile of double track. At the inclined plane there is a stationary power of two 25 horse-power engines working on one crank. Locomotive power is used on the road. It had cost, including motive power, cars, and everything complete, ready for use, $904,499 or $6625.92 per mile.

This road will be continued, or rather the Georgia road will connect with it and pass through Atlanta and thence westward to the Mississippi, thus forming one of the most important roads in the Union.

The route from Charleston to Hamburg, 135 miles, is performed in less than twelve hours with great ease, and will be done in eight hours."

Interesting Facts About the Locomotives Best Friend and West Point of the Charleston & Hamburg R. R. and Incidents of the Opening Days of That Road From "A History of Transportation in the Eastern Cotton Belt to 1860," by Ulrich B. Phillips.

"After the Best Friend explosion it was made over and rendered good service under the name "Phoenix." About this time the West Point began running. A notice published in the Charleston Mercury of July 31 says: 'The locomotive engine runs every day for passengers at half past four p. m. Parties wishing it at any other hour can be accommodated by applying to the engineer.' These first engines in spite of their primitive construction and small power, could run at sixteen to twenty-one miles per hour, carrying five or six of its little cars and forty to fifty passengers. With the empty cars they could run thirty-five to forty miles an hour. The effect of the engine in motion upon the native rustics is indicated by an anecdote published in the Atlanta Constitutionalist March 20, 1835.

"A farmer from the upper country who had never heard of steam engines happened to be driving his team near the track when the train came along full steam. The mules ran away and destroyed the wagon and contents. When picked up the wagoner was asked why he hadn't held on to his team. 'Hold on' said Hodge, 'How the d—l could you expect me to hold on, when I saw H—ll in harness coming down on me.' "!

JAS. M. KIMBALL.

The Early English Engines That Came to America

By Chas. E. Fisher.

In Bulletin No. 5, issued by this Society, Mr. G. W. Bishop, our English Representative, presented a brief sketch of a few of the English-built locomotives that came to this country, but closed his contribution by expressing the wish that further details and additional information could be published.

In 1838, the Secretary of the Treasury made a survey of every boiler in service in this country. The data relating to steam locomotives was presented to our members in Bulletin No. 6. This report is made the basis of the present list that will follow and we have every reason to believe that it is fairly accurate. The report of Messrs. Knight and Latrobe, published the same year and that we presented to our members in Bulletin No. 13 gives additional information.

For several years the writer has made a search through annual reports and early works for this data. Unfortunately the country that produced these locomotives has shown but little willingness to co-operate in this work.

In 1928, this subject was well covered by Dendy Marshall in his book—"Two Essays in Early Locomotive History," a review of which appeared in Bulletin No. 18. Mr. Marshall has had access to the English source and it is interesting to note that this list agrees with his, in the main. Those who desire additional description and details are referred to Mr. Marshall's work as the following is simply a check list for immediate reference.

In making up this list, I have placed my references after each locomotive and these will be found at the end of the list. The dates are not of vital importance over a variation of a year for not infrequently were the locomotives referred to constructed in the later months of a year and the slow means of transportation did not allow the locomotive to enter service until the early months of the year following, so that the dates that we find in reports on this side many of them are when the engine entered service and those of Mr. Marshall are when the engine was constructed.

The list which follows is arranged according to the year with the road the engine was built for, road name or number and the builder.

1828

Delaware & Hudson Canal Co.	"America"	Robert Stephenson, 2-6-8.
Delaware & Hudson Canal Co.	"Stourbridge Lion"	Foster, Rastrick & Co., 2-6-8.

1829

Delaware & Hudson Canal Co.	"Delaware"	Foster, Rastrick & Co., 5-6-8.
Delaware & Hudson Canal Co.	"Hudson"	Foster, Rastrick & Co., 5-6-8.

1830

None

1831

Camden & Amboy R. R.	"John Bull"	Robert Stephenson, 2-5-6.
Mohawk & Hudson R. R	"John Bull"	Robert Stephenson, 2-5-6.
Mohawk & Hudson R. R	"Mohawk"	Robert Stephenson, 5-6.
Mohawk & Hudson R. R	"Hudson"	Robert Stephenson, 5-6.
New Castle & Frenchtown R. R.	"Delaware" 11x16", 4 wheels, 8 tons, 38 h.p.	Robert Stephenson, 1-4-6.

With regards to the Mohawk & Hudson locomotives, the "John Bull" was built under the name "Robert Fulton." Wm. H. Brown in his "History of the First Locomotives in America" states the "De Witt Clinton" was dubbed "Brother Jonathan" and the "R. Fulton" was dubbed "John Bull." These three locomotives together with a "Brother Jonathan" appear in a report of the Mohawk & Hudson R. R. dated 1840 and valued at $7000.00 each. It is obvious from this report that the "Brother Jonathan" mentioned was the one received at a later date and that the "Robert Fulton" appeared on the roster of the road as the "John Bull."

1832

Baltimore & Susquehanna R. R.	"Herald", 15 h.p.	Robert Stephenson, 1-5-6.
Boston & Lowell R. R.	"Stevenson" 30 h.p.	Robert Stephenson, 1-4-5-6.
Boston & Worcester R. R.	"Boston"	Robert Stephenson, 5-6.
New Castle & Frenchtown R. R.	"Pennsylvania" 11x16" 4 wheels, 9 tons, 40 h.p.	Robert Stephenson, 1-6.
New Castle & Frenchtown R. R.	"Phoenix" 9x20" 4 wheels, 8 tons, 38 h.p.	Robert Stephenson, 1-6.
Petersburg R. R.	"Pioneer"	Rothwell & Co., 6.
Pontchartrain R. R.	"Pontchartrain" 24 h.p.	Rothwell, Hick & Rothwell, 1-6.
Richmond, Fredericksburg & Potomac R. R.	"Roanoke" 9 h.p.	Edward Bury, 1-6.
Saratoga & Schenectady R. R.	"Fire Fly" 12 h.p.	Robert Stephenson, 1-6.

1833

Allegheny Portage R. R.	"Delaware"	Braithwaite, Milner & Co., 6-7.
Boston & Providence R. R.	"Whistler" 30 h.p.	Robert Stephenson, 1-6.
Camden & Woodbury R. R.	"Fire Fly" 12 h.p.	C. Tayleur & Co., 1-6.
Camden & Woodbury R. R.	"Red Rover" 12 h.p.	C. Tayleur & Co., 1-6.
Greenville & Roanoke R. R.	"Nottoway" 15 h.p.	Rothwell & Hick, 1-6.
New Castle & Frenchtown R. R.	"Virginia" 11x16", 4 wheels, 9 tons, 40 h.p.	Robert Stephenson, 1-4-6.
New Jersey & Paterson R. R.	"McNeil" 9½x16" 48"	Robert Stephenson, 3-4. Braithwaite, Milner & Co. 6-7.
Petersburg R. R.	"New York"	Mather, Dixon & Co., 7.
Petersburg R. R.	"Philadelphia"	Mather, Dixon & Co., 7.
Philadelphia, Germantown & Norristown R. R.	"Philadelphia"	Robert Stephenson, 5-6.
Pontchartrain R. R.	"Creole" 20 h.p.	Edward Bury, 1-6.
Raleigh & Gaston R. R.	"Meherrin" 20 h.p.	Edward Bury, 1-6.
Raleigh & Gaston R. R.	"Appamattox" 20 h.p.	Edward Bury, 1-6.
Richmond & Petersburg R. R.	"Liverpool" 15 h.p.	Edward Bury, 1-6.
Saratoga & Schenectady R. R.	"Davy Crockett" 4-2-0, 9x14" 53", 12 h.p.	Robert Stephenson, 1-5-6.
Saratoga & Schenectady R. R.	"Fire Fly" 4-2-0, 9x14" 54", 12 h.p.	Robert Stephenson, 1-2-5-6.
South Carolina C. & R.R. Co.	"Edgefield" 0-4-0	Robert Stephenson, 2-6.

Both Marshall and Warren in his "A Century of Locomotive Building," place the "Whistler" as being built in 1829. From the files of the "Boston Courier" copy of August 20, 1834, we find mention of this locomotive and that it was probably the first one on the road, the road being opened by an excursion train on June 5th, 1834, but not opened for regular travel until August 25th of that year. The Boston & Providence R. R., however, was not incorporated until 1831 so that it is difficult to understand how Major Whistler, who received his First Lieutenant's Commission on Aug. 16th of that year could have ordered an engine for a road, not yet chartered by the State of Massachusetts. The U. S. Report of 1838, places the date of construction in 1833, though possibly the engine might have been built the year previous, but hardly as early as 1829, unless it had seen service in England prior to its reception here.

The "McNeil" is given by two authorities as being built by Stephenson, but it would seem that Braithwaite, Milner & Co., were the correct builders of this locomotive. Mr. Marshall places it as such and personal correspondence verifies this claim.

1834

Allegheny Portage R. R.	"Allegheny"	Braithwaite, Milner & Co., 6-7.
Allegheny Portage R. R.	"Pennsylvania"	Robert Stephenson, 6-7.
Allegheny Portage R. R.	"Philadelphia"	Robert Stephenson, 6-7.
Boston & Worcester R. R.	"Meteor" 30 h. p.	Robert Stephenson, 1-6.
Mohawk & Hudson R. R.	"Brother Jonathan"	Robert Stephenson, 5-6-7.
Petersburg R. R.	"Petersburg"	Mather, Dixon & Co., 7.
Pontchartrain R. R.	"Fulton", 16 h.p.	B. Hick & Son., 1-6.
Portsmouth & Roanoke R. R.	#1, 14 h.p.	Robert Stephenson, 1-6.
Portsmouth & Roanoke R. R	#2, 14 h.p.	Robert Stephenson, 1-6.
Raleigh & Gaston R. R.	"Staunton"	Edward Bury, 1-6.
Raleigh & Gaston R. R.	"Petersburg"	Edward Bury, 1-6.
Richmond, Fredericksburg & Potomac R. R.	"Richmond" 14 h.p.	Robert Stephenson, 1-6.
South Carolina C. & R.R. Co.	"Georgia" 12 h.p.	Edward Bury, 1-5-6.
South Carolina C. & R.R. Co.	"Augusta"	Edward Bury, 1-5-6.
South Carolina C. & R.R. Co.	"Wm. Aiken" 10x16", 12 h.p.	Robert Stephenson, 1-5-6.
South Carolina C. & R.R. Co.	"E. Horry"	Robert Stephenson, 1-5-6.
South Carolina C. & R.R. Co.	"Columbia"	Fenton & Co., 5.

1835

Boston & Providence R. R.	"Boston" 30 h.p.	Edward Bury, 1-4-5-6.
Boston & Providence R. R.	"New York" 30 h.p.	Geo. Forester, 1-4-5-6.
Boston & Worcester R. R.	"Comet" 30 h.p.	Robert Stephenson, 1-4-5-6.
Boston & Worcester R. R.	"Rocket" 30 h.p.	Robert Stephenson, 1-4-5-6.
Boston & Worcester R. R.	"Mercury" 30 h.p.	Robert Stephenson, 1-4-5-6.
Boston & Worcester R. R.	"Jupiter" 30 h.p.	Robert Stephenson, 1-4-5-6.
New Castle & Frenchtown R. R.	"Comet", 11x16" 6 wheels, 7½ tons	Robert Stephenson, 4.
Philadelphia & Columbia R. R.	"Comet"	Robert Stephenson, 6-7.
Philadelphia & Columbia R. R.	"Rocket"	Robert Stephenson, 6-7.
Philadelphia & Columbia R. R.	"Kentucky" 25 h.p.	Robert Stephenson, 1-6.
Philadelphia & Columbia R. R.	"John Bull" 20 h.p.	Robert Stephenson, 1-6.
Philadelphia & Columbia R. R.	"Atlantic" 20 h. p.	Robert Stephenson, 1-6.
Philadelphia & Columbia R. R.	"Fire Fly"	Robert Stephenson, 5-6.
Philadelphia & Columbia R. R.	"Red Rover"	Robert Stephenson, 5-6.

Philadelphia & Columbia R. R.	"Albion"	Robert Stephenson, 5-6.
Philadelphia, Wilmington & Baltimore R. R.	"Wilmington" 20 h.p.	Edward Bury, 1-6.
Portsmouth & Roanoke R.R.	#3	Edward Bury, 1-6.
Richmond, Fredericksburg & Potomac R. R.	"Augusta" 11 h.p.	Edward Bury, 1-6.
Richmond, Fredericksburg & Potomac R. R.	"Fredericksburg" 11 h.p.	Edward Bury, 1-6.
South Carolina C. & R.R. Co.	"H. Schultz" 14 h.p.	Rothwell, 1-5-6.
South Carolina C. & R.R. Co.	"Sumter" 16x22½", 14 h.p.	Robert Stephenson, 1-5-6.
South Carolina C. & R.R. Co.	"Marion" 16x22½", 14 h.p.	Robert Stephenson, 1-5-6.
South Carolina C. & R.R. Co.	"Ohio" 16x22½", 14 h.p.	Robert Stephenson, 1-5-6.
South Carolina C. & R.R. Co	"Cincinnati" 10x16", 12 h.p.	C. Tayleur & Co., 1-5-6.
South Carolina C. & R.R. Co.	"Allen" 10x16", 12 h.p.	C. Tayleur & Co., 1-5-6.
South Carolina C. & R.R. Co.	"Kentucky" 10x16", 12 h.p.	C. Tayleur & Co., 1-5-6.

The Report of the Philadelphia & Columbia R. R. for 1838, shows the last five engines on the above list as furnished by A. & G. Ralston in 1835. That they were built by Stephenson, there is little doubt.

Mr. Marshall in his book credits Portsmouth & Roanoke No. 3 to Stephenson and the No. 5 to Bury. Changes in the numbers may have been made by the road after the engines were received but the U. S. Report of 1838 is followed here.

The S. C. C. & R. R. Co.'s "Cincinnati" was renamed "Alabama."

1836

Bangor & Piscataquis R. R.	"Pioneer" 20 h.p.	Rothwell & Co., 1-3-6-7.
Bangor & Piscataquis R. R.	"Bangor" 20 h.p.	Rothwell & Co., 1-3-6-7.
Baltimore & Susquehanna R. R.	"Harrisburg"	Robert Stephenson, 5-6.
Baltimore & Susquehanna R. R.	"Wrightsville"	Robert Stephenson, 5-6.
Boston & Worcester R. R.	"Lion" 30 h.p.	Edward Bury, 1-4-6.
Lexington & Ohio R. R.	"Nottoway" 10 h.p.	Robert Stephenson, 1-7.
Lexington & Ohio R. R.	"Elkhorn" 10 h.p.	Robert Stephenson, 1-7.
Petersburg R. R.	"Weldon"	Braithwaite, Milner & Co., 6-7.
Pontchartrain R. R.	"Orleans" 16 h.p.	Edward Bury, 1-6.

Portsmouth & Roanoke R.R.	#4, 14 h.p.	Robert Stephenson, 1-6.
Portsmouth & Roanoke R.R.	#5, 14 h.p.	Robert Stephenson, 1-6.
Raleigh & Gaston R. R.	"Gaston", 20 h.p.	C. Tayleur & Co., 1-6.
Raleigh & Gaston R. R.	"Raleigh" 20 h.p.	C. Tayleur & Co., 1-6.
Richmond, Fredericksburg & Potomac R. R.	"Potomac" 14 h.p.	B. Hick & Co., 1-6.
South Carolina C. & R.R. Co.	"Tennessee" 9 h.p.	Rothwell, 1-5-6.

The two engines on the Bangor & Piscataquis R. R., while resembling those built by Robert Stephenson, were made from drawings of the latter company but were built by Rothwell & Co. There is also some variation in the dates of construction but again the U. S. Report of 1838 has been followed.

The "Lion" on the Boston & Worcester R. R. was afterwards named "Brookline."

1837

Allegheny Portage R. R.	"Comet"	Braithwaite, Milner & Co., 6-7.
Baltimore & Susquehanna R. R.	"Baltimore" 20 h.p.	Robert Stephenson, 1-5-6.
Baltimore & Susquehanna R. R.	"Susquehanna" 20 h.p.	Robert Stephenson, 1-5-6.
Carrollton R. R.	"New Orleans" 34 h.p.	B. Hick & Co., 1-6.
Raleigh & Gaston R. R.	"Roanoke" 20 h.p.	Edward Bury, 1-6.
Raleigh & Gaston R. R.	"Virginia" 20 h.p.	B. Hick & Co., 1-6.
Richmond & Petersburg R. R.	"John Randolph" 14 h.p.	Edward Bury, 1-5-6.
Richmond & Petersburg R. R.	"Sheppard" 10x16" 54", 14 h.p.	Edward Bury, 1-5-6.
Richmond & Petersburg R. R.	"Stafford" 10½x16" 42", 14 h.p.	Edward Bury, 1-5-6.
Richmond & Petersburg R. R.	"Patrick Henry" 10x16" 54", 14 h.p.	Edward Bury, 1-5-6.
Richmond & Petersburg R. R.	"Robert Morris" 14 h.p.	B. Hick, 1-6.
Richmond & Petersburg R. R.	"Oliver Evans" 14 h.p.	B. Hick, 1-6.
Richmond, Fredericksburg & Potomac R. R.	"Louisa" 14 h.p.	B. Hick, 1-6.
Richmond, Fredericksburg & Potomac R. R.	"Jefferson" 14 h.p.	Braithwaite, Milner & Co., 1-6.
Wilmington & Raleigh R. R.	"Wayne" 14 h.p.	Robert Stephenson, 1-6.
Wilmington & Raleigh R. R.	"Nash" 14 h.p.	Robert Stephenson, 1-6.

The "Comet" on the Allegheny Portage R. R. may have been the engine of the same name on the Philadelphia & Reading R. R.

The "Baltimore" and "Susquehanna" on that road were subsequently renamed "Chieftain" and "Sampson" and will be found as such in their locomotive vosters.

1838

Philadelphia & Reading R. R.	"Rocket"	Braithwaite & Co., 5-6.
Philadelphia & Reading R. R.	"Fire Fly"	Braithwaite & Co., 5-6.
Philadelphia & Reading R. R.	"Spitfire"	Braithwaite & Co., 5-6.
Philadelphia & Reading R. R.	"Planet"	Braithwaite & Co., 5-6.
Philadelphia & Reading R. R.	"Dragon"	Braithwaite & Co., 5-6.
Philadelphia & Reading R. R.	"Comet"	Braithwaite & Co., 5-6.
Richmond & Petersburg R. R.	"J. H. Hopkins" 10x16" 48".	Rothwell & Hick, 5.
Richmond & Petersburg R. R.	"Phoenix" 10x16" 54".	Rothwell & Hick, 5.

The engines on the Philadelphia & Reading R. R. were renamed as follows: "Fire Fly" renamed "Engineer"; "Dragon" renamed "Atlanta" and "Comet" renamed "Antelope." The "Spitfire" was sold to the Leggett's Gap R. R., now part of the D. L. & W. R. R.

1839

None

1840

Philadelphia & Reading R. R.	"Hecla"	Braithwaite & Co., 5-6.

1841

Philadelphia & Reading R. R.	"Gem"	Braithwaite & Co., 5-6.

The above engine was later sold to the Mine Hill & Schuylkill Haven R. R.

An examination of the locomotive rosters of the various roads shows additional engines of interest. The report of the Philadelphia & Reading R. R. for 1865 lists the "Catawissa" as being built by Bury. This road listed their motive power from the date the engine was placed in service, hence the date given in the report is of no valve as a construction date. This engine was received from the Little Schuylkill R. R., when that road was leased by the Philadelphia & Reading R. R. and was one

doubtless purchased second hand by the Little Schuylkill R. R.

In the Report of 1849 of the Philadelphia, Wilmington & Baltimore R. R., we find a "John Bull," 11x18" 50" as "built in England." This may have been the old "Wilmington" renamed.

The report of the Seaboard & Roanoke R. R. for 1853 shows the "Portsmouth" as being built by Tayleur, England. Other than the engine weighed 10 tons, no data is given, but is doubtless one purchased from one of the other roads.

The "Farmingdale," a single driver, built by Bury in 1835, is shown on the roster of the Penobscot & Kennebec R. R. This also was doubtless purchased from some other road.

The "Comet" mentioned by Mr. Marshall, on the Old Colony R. R., was the engine of the same name on the Boston & Worcester R. R.

The "Phoenix," mentioned by Mr. Marshall as going to the Eastern R. R., was an English built engine doubtless taken in part payment by the Hinkley & Drury people and loaned to the Whitneyville & Machiasport R. R., until their locomotives "Tiger" and "Lion" were completed. Upon the arrival of their two locomotives the "Phoenix" departed for parts unknown. This was the engine mentioned by Mr. Given in his "Early Engines in the State of Maine" as coming from Canada.

That this list may contain some errors and need some correcting the author is aware. Additional information will be acceptable. The only regret is that more co-operation was not shown in the country from which these locomotives came.

Sources of Information

1 U. S. Report of 1838 by the Secretary of the Treasury.
2 Stretton—"Development of the Locomotive."
3 Notes in our Bulletins.
4 Report of Messrs. Knight & Latrobe, 1838.
5 Individual Railroad Rosters.
6 Marshall—"Two Essays in Early Locomotive History."
7 Personal Correspondence.
8 Reports of the Newcomen Society.

The Atlantic City High Speed Line

By Granville Thomas.

Atlantic City, the "Playground of the World," has 10,000,000 visitors annually. The railways transport about 6,000,000 of them and the busses and private cars account for the balance. This immense passenger business has developed the fastest train service in the United States.

From Camden to Atlantic City the Pennsylvania R. R. operates two lines and the Philadelphia & Reading Ry. one. The Pennsylvania also operates through trains from Philadelphia via the bridge over the Delaware River. From New York, the Pennsylvania R. R. operates three hour trains via Delair and Haddonfield and the Jersey Central R. R. operates through trains, including the new "Blue Comet" over the Southern Division to Winslow Jct., and then to the shore over the Philadelphia & Reading Ry.

The history of the development of these high speed lines is of no little interest.

The original line was the Camden & Atlantic R. R. This road was built and opened in 1854 to develop Absecon Island as a summer resort and to serve the window glass factories at Winslow, Waterford and Jackson.

The first train to run from Camden to Atlantic City was drawn by the engine "Atsion" and made the first trip on July 4, 1854. At that time there were seven houses on the island. As late as 1859 two round trips daily were sufficient to handle the traffic.

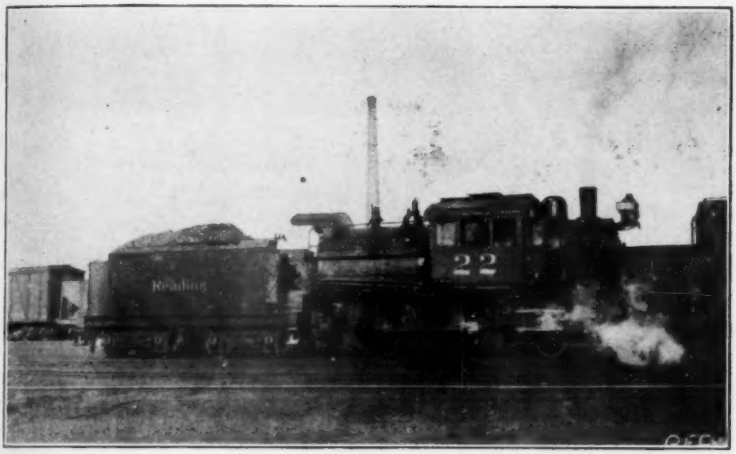
Up to 1877 the Camden & Atlantic R. R. had no competition. Then a new company, the Philadelphia & Atlantic R. R. was formed. The directors were some that had left the fold of the Camden & Atlantic R. R. The new road was narrow gauge, laid with 50 pound rail and opened for traffic after three months of construction. Fares were reduced one dollar in order to stimulate travel. The running time was two and one-half hours. The road never was much of a success until 1883 when the Philadelphia & Reading bought it, made it standard gauge, and double tracked it, making it a first class road.

Prior to this the Pennsylvania R. R. had become interested in the West Jersey R. R. In 1880 a connection was built from

Newfield to Atlantic City in order that that road might obtain a share of the Atlantic City business. The Pennsylvania R. R. electrified this line using the third rail system, in 1906. No fast schedules are attempted over this line and it seems to be used to take care of the overflow of traffic from the other line.

It was not until 1883 that the Pennsylvania R. R. bought the Camden & Atlantic R. R. Then real competition started and the results aroused world wide attention.

The ferry trip from Camden was longer via the Philadelphia & Reading than via the Pennsylvania. The mileage from Camden to Atlantic City was 55.5 over the Reading and 58.8 over the Pennsylvania. Both roads had an almost level track. In it are two stretches, one of 18 miles, the other of 7 of perfectly straight track. Never was a better scene laid for speed!



P. & R. #22—One of the Smaller Engines Formerly Used Between Camden and Atlantic City

The first fast trains were light and easily handled by the "American" or 4-4-0 type. The Pennsylvania R. R. used their D-11-A and D-13-C class of locomotives while the Reading used an engine of this type with the "Wootten" boiler known as the "Mother Hubbard," such as the No. 22 in the illustration. These engines were good steamers at a sustained speed until the running time was reduced.

In 1888 the schedule time between Camden and Atlantic City was 85 minutes. The next year the Reading reduced it to 80 minutes. This was met by the Pennsylvania R. R. In 1890 the running time was again reduced to 75 minutes and in 1891 it was reduced to 73 minutes, the Pennsylvania following each reduction.

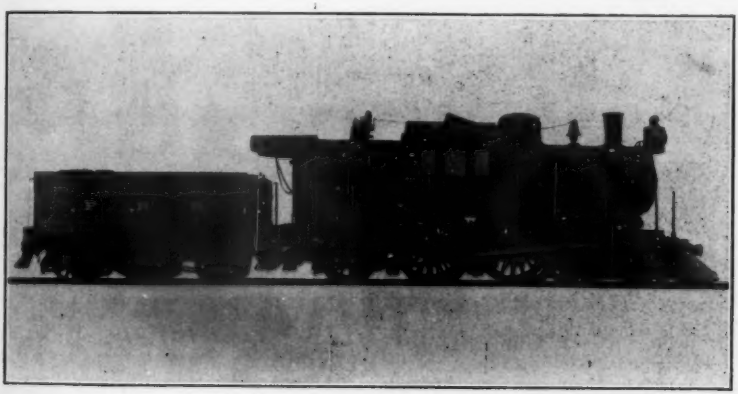
P. & R. #26—One of the First 4-4-2 Type Used on the Camden-Atlantic City Line

In 1897 the Baldwin Locomotive Works delivered to the Philadelphia & Reading Ry. two Vauclain compound Atlantic type engines, numbers 1026 and 1027. These engines with their larger fireboxes and boilers enabled the Reading to make a further reduction in the running time possible. From Camden to Atlantic City, the 55.5 miles was made in 52 minutes and the running time from Philadelphia was just one hour.

During that summer the No. 1027 covered herself with glory. The train despatchers sheet is preserved in several histories. The best time was on July 14 when the run was made in 46.5 minutes at the average speed of 71.6 miles an hour. These engines ran the 52 days of the beach season, July 2 to August 31, 1897, at an average speed of 48 minutes per trip or 69 miles an hour.

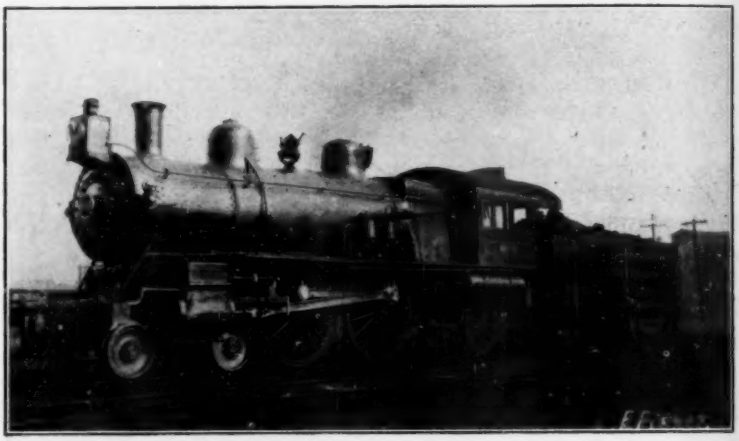
P. R. R. 6072—Class D-16 6

Not to be outdone, the Pennsylvania R. R. duplicated this schedule, but it became very difficult for them to carry it out. The road still used the 4-4-0 type, road classification D-16-A, which under ordinary conditions could make the run from Philadelphia to Atlantic City in 60 minutes, but if an extra car or two was added or the ferry slightly delayed, made it impossible to make the schedule time.



P. R. R. #820, E-1, Juniata Shops, 1900

The performance of the Atlantic type on the Reading convinced the Motive Power Department that it was a good type of engine for speed. In 1899 a locomotive of this type was designed by Mr. Axel Vogt, classified as E-1. This was of the "Mother Hubbard" variety with the cab over the middle of the boiler. Three engines were built and placed in service in 1899. They were successful and from Hammonton down could be counted to handle a 300 ton train 75 miles an hour. The "Mother Hubbard" type of engine was never looked upon with favor by the officials on account the engineer and fireman being separated. After various experiments with blocking off a portion of the grate, a revised design, with cab in the rear was built and were classified as E-2. Later improvements on this class brought out the E-3 class. The three engines of the E-1 class were placed in service on the Long Island R. R.

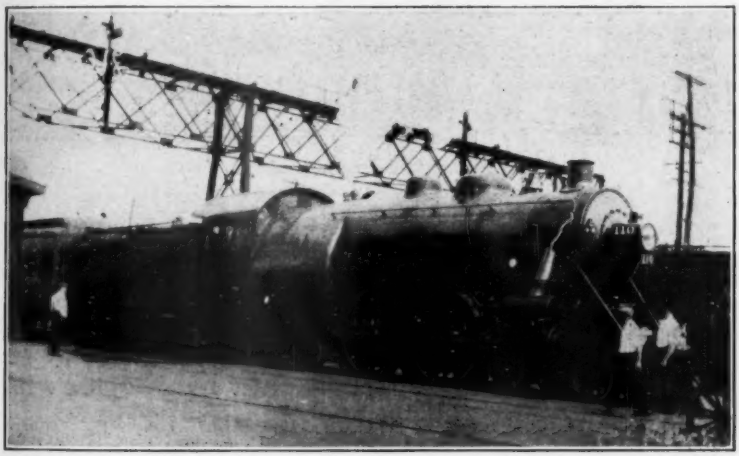


P. R. R. #6076, Class E-2-A. A Class of Engine that Gave Good Service Between Camden and Atlantic City

With the Atlantic type perfected the highest speed was realized. Both roads adhered to a sixty minute schedule from Philadelphia to Atlantic City. With the increase in the weight of trains, heavier engines of this type were built. In 1914, the E-6-s class, the heaviest Atlantic type of locomotive in the world, was built by the Pennsylvania and a few engines of this class

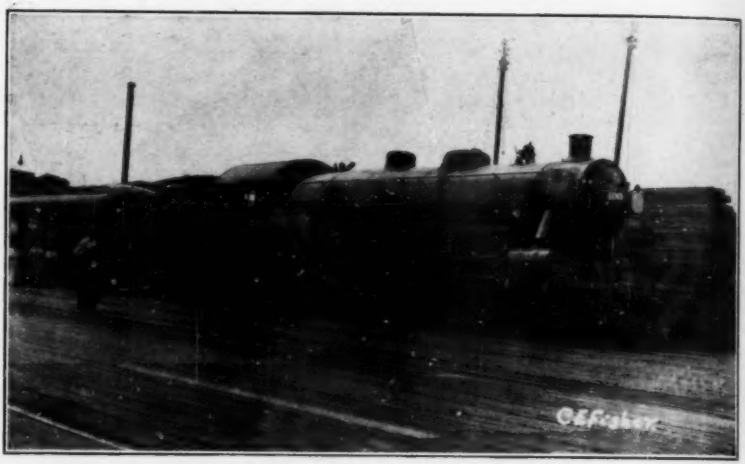
P. R. R. # 6056—E-6-S

were assigned to this run. In 1915 the Reading brought out some locomotives of the 4-4-4 wheel arrangement but the following year these were rebuilt to the Atlantic type. Since then the Reading has used engines of the Pacific type on these trains.



P. & R. # 110, Reading Shops, 1915. Five of These Engines Were Built and Tried on This Run

The latest safety precautions are used on both roads. The Reading have used the automatic train control for nearly five years. This type of control allows three speeds; 20, 40 and 80 miles per hour. If the engineer exceeds the speed shown by the visible signal, the brakes are applied and a report must be made by the Conductor at the end of the trip. Up to Jan. 1, 1927, of the 57 engines thus equipped with a total of 2,780,000 train miles, not a single important failure had been made. A total of 68,000 trains had been operated. The Pennsylvania R. R. have also adopted this same system.



P. & R. # 105—Reading Shops, 1916

During the summer a large number of one day and week end excursions are operated. Of the 6,000,000 passengers carried annually, the Reading carried about 2,000,000 and the Pennsylvania 4,000,000. The later road has the advantage of the Delaware River Bridge and routing western traffic from its own lines to Atlantic City. With a perfect road bed, 130 pound rail, both roads are doing their best to keep these schedules up to time.

The following tables show the development of the motive power on both roads:

Pennsylvania R. R.

Built	Type	Classification	Drivers	Steam Pressure	Total Weight	Tractive Effort
1883	4-4-0	D-11-A	68″	140 #	100670 #	14370 #
1893	4-4-0	D-13-C	68″	175 #	114500 #	17970 #
1895	4-4-0	D-16-A	80″	185 #	134500 #	17500 #
1899	4-4-2	E-1	80″	185 #	173450 #	21480 #
1900	4-4-2	E-2	80″	205 #	186480 #	23800 #
1901	4-4-2	E-3	80″	205 #	183500 #	27479 #
1914	4-4-2	E-6-S	80″	205 #	243600 #	31275 #
1924	4-6-2	K-4-S	80″	205 #	308900 #	44460 #

Philadelphia & Reading Ry.

Built	Type	Classification	Drivers	Steam Pressure	Total Weight	Tractive Effort
1883	4-4-0		61¾″		93000 #	
1890	4-4-0		68½″	160 #	105500 #	19300 #
1896	4-4-2		84¼″	200 #	142900 #	14400 #
1903	4-4-2	P-4	84¼″	225 #	178000 #	24000 #
1907	4-4-2	P-5	86 ″	225 #	220500 #	
1918	4-6-2	G-1	80 ″	220 #	173600 #	40900 #

The above facts in connection with this article were obtained through the kindness of Mr. R. H. Sanford, Librarian, Baldwin Locomotive Works, Mr. G. B. Harley, Special Agent of the Pennsylvania R. R., Mr. E. D. Osterhoult, General Passenger Agent, Philadelphia & Reading Ry., and the publications of the Baldwin Locomotive Works and Atlantic City Chamber of Commerce Bulletin.

Pioneer Locomotives on the Pacific Coast

By T. C. Young, Jasper, Alberta, Canada.

Extracted from the Writer's Ms. and adapted for the R. & L. H. Society by Norman Thompson.

The first locomotive to operate on the Pacific slope came around the Horn in the year 1855, having been built at the Globe Works, Boston, Mass. in 1849, being named "Elephant". Although landed at San Francisco, she was not set up there, but was bought by the Sacramento Valley Railway and shipped to the City of that name by river schooner. The name was also changed to "C. K. Garrison" in honour of the President of the railway. In 1868 the name was again altered to "Pioneer" in recognition of this being the first locomotive employed in California.

The second one to come to this State was the "Governor Stanford", built by R. Norris and Son, and this also came by way of the Horn on the Schooner "Herald-of-the-Morning". After being landed at San Francisco on August 19th, 1863, she was again shipped to Sacramento on the schooner "Anna R. Forbes", in October 1863 (7th) and placed in service on November 11th, 1863 on the Central Pacific Railway of California, the first locomotive to operate on that line.

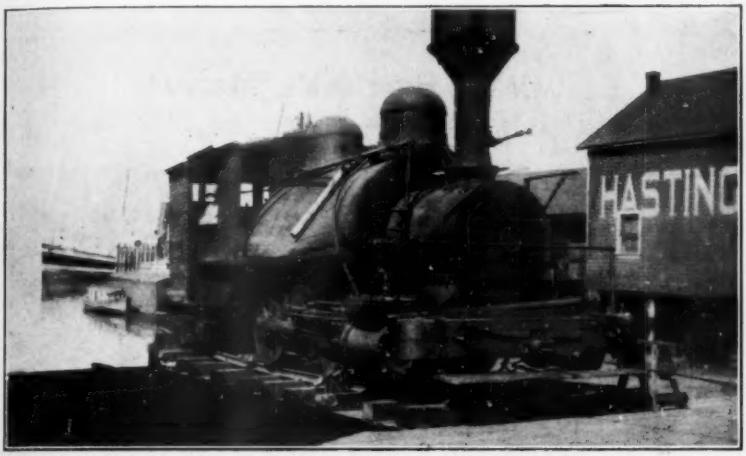
The third locomotive to arrive in the Golden State was the C. P. Huntington, originally the three-spot of the Central Pacific Railway, having come via the Horn on the sailing vessel "Success", and being placed in service on April 1864. Of these early engines, the last is the only one to be preserved for the coming generations to view, recalling the pioneer days of railroading in California. This locomotive occupies a place of honour on the Plaza of the Southern Pacific Station in Sacramento.

The first locomotive in British Columbia was brought into that Province by Mr. Onderdonk, General Manager for the Contracting Firm of D. C. Mills & Co., from California, being unloaded from the river steamer at Emery, five miles downstream from Yale, in the Autumn of 1880. The second one was a small switching engine, built by the Union Iron Works of San Francisco, and it arrived a month later. This engine in 1925 was still in service for a lumber company at Mud Bay, B. C. There is a story that No. 1 is now at the Hastings Mill (Vancouver) being scrapped, but it is possible that this may be No. 2.

A Baldwin locomotive weighing 90 tons was unloaded at Port Moody in the early winter of 1883-4, from a vessel onto a raft and towed ashore, pulling the first through train from tidewater to Yale on January 23rd, 1884, taking ten hours to cover 91 miles.

Supplied by Engineer (Retired) E. E. Austin, of Vancouver

Re 'Old Curly'. This was the second engine brought into British Columbia, being known as No. 2 "Emory", named after the point on the C. P. R. 8 miles West of Yale where construc-



The Second Engine Brought to British Columbia

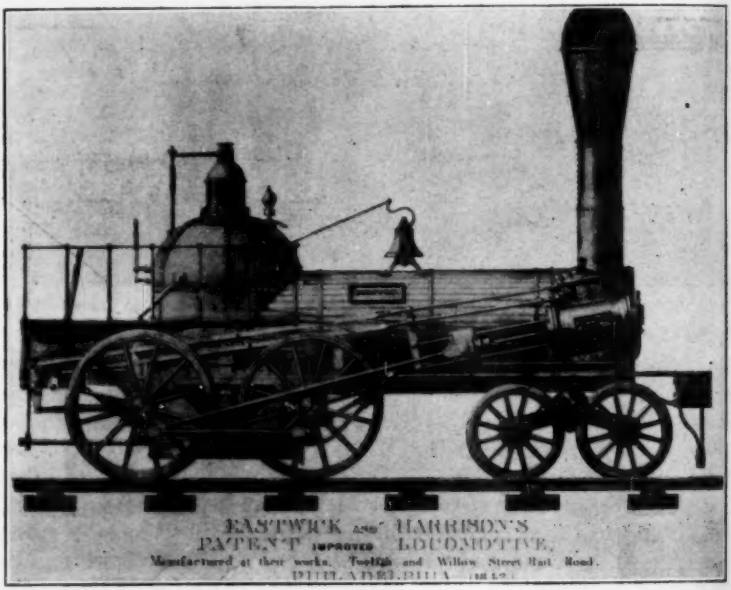
tion commenced. She was landed on the river bank there and repaired by Engineer Austin with a hammer, chisel and file. The date of her arrival on the Fraser River was either the end of 1880 or the Spring of 1881. She was a saddle-tank 0-4-0 wheel type, and in very poor condition when received. Cylinders 14x20", weight about 40,000 lbs. Drivers 42". The smoke-box door ring was lettered: "Built by Union Iron Works". (San Francisco). Of course this might have applied to the smoke-box door ring only, but Mr. Austin states that it was always his understanding that the entire machine was constructed by that Firm, and not in France as stated in the Canadian Railway and Marine World. He says also that she was previously utilized in

connection with the construction of the sea wall at San Francisco, and that the date of her arrival in British Columbia renders it an impossibility that she could ever have had any part in the building of the Panama Canal by the French Company.

The actual first engine in British Columbia was No. 1, named "Yale", which came from the Virginia and Truckee Railway in Nevada. No. 3 (named "New Westminster") No. 4 and No. 5 also came from the same line. These were all Moguls. Nos. 1, 3 and 4 were also landed at Emery, but No. 5 came ashore at Port Moody (the first terminal point of the C. P. R., before the extension to Vancouver was built), in November 1884.

Eastwick & Harrison's "Mercury"

Abridged by NORMAN THOMPSON



In 1837 there was built by Messrs. Eastwick and Harrison, Philadelphia, the first locomotive embodying the equalizing lever for load distribution on the driving wheels, named 'Hercules',

being of practically identical construction to the 'Mercury' which was built in 1842. The springs were placed under the centres of the two equalizing levers, the load being transmitted at each end of the levers to the wheels and so greatly increasing the tractive power of the engine. The patent was disposed of to Matthais W. Baldwin, and adopted at the works of that name.

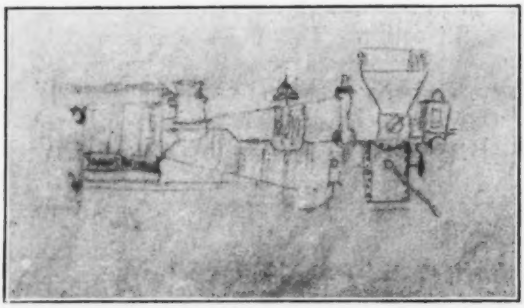
A reversing device was also invented by Mr. Eastwick (the equalizing lever being the contribution of Joseph Harrison Jr.) consisting of a thick block of cast iron interposed between the slide valve and the ports of the cylinder. One pair of passages passed straight through the block, and another pair crossing over diagonally, and emerging on the lower face at the opposite end from that of entrance. When this block was in such a position that the ports passing straight through were in line with the cylinder ports, the engine ran in the forward direction; when shifted so that the cross-over ports came in line, the steam was delivered at the opposite ends of the cylinder and the engine ran in the reverse direction. This block was moved by means of a separate rod and reverse lever. This ingenious construction worked very well, but was soon superseded by the link motion.—Henry Harrison Suplee, Mem. A. S. M. E. New York City, in 'Mechanical Engineering' for August, 1929.

Some Interesting Letters

Furnished by Mr. Inglis Stuart

North Hollis, Feb. 6, 1908.

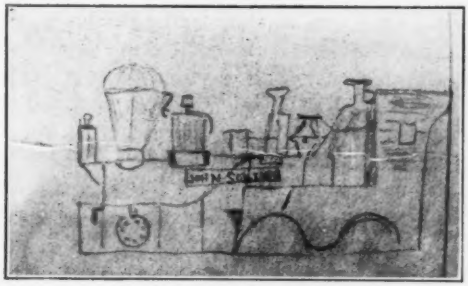
Mr. Ezra Russell, Dear Sir:—I received your much appreciated letter a few days ago. In my first I wrote that I did not think The Amoskeag Shop was building locomotives as early as the last of the 40ties. Since then I have written to my brother to find out when they commenced. In the Public Library, he located the following in a "History of Manchester" written in 1856 by C. E. Potter. This is what he says:—"The first locomotive was the Etna built for the Northern R. R. in 1849. The last built were for the Michigan Central and numbered 212 to 218 and have orders on hand for 12 or 14 more." That was their last order and must include the E. J. M. Hale; John Kimball; Josiah



Sketch of the "Stickney"

Stickney and James Hayward. The last (Hayward) was shop number 222 and was built in 1856 by O. W. Bailey. Her number and date with the Agent's name, and that of the shop were on a fancy, reddish colored brass plate between the drivers (I sketched it several times when a boy). Another, the Madison, had on the side of her steam chests a plate reading "Manchester Locomotive Works, O. W. Bailey, Agent, No. 21, 1854. The Spaulding was built at the same shop in 1851. Her road number was 13. As the History states that O. W. Bailey resigned in 1855 to take charge of what is now Blood's Shop, those two latter must have been Amoskeag engines. So probably your old engines were some of the very first and built by O. W. Bailey. The name of the first agent of the Amoskeag Shop was William

Burk and he resigned in 1849 to take charge of the Lowell Machine Shops, while Bailey took his place at the Amoskeag. Many of the Concord R. R. engines were old Amoskeags. The four last referred to, Hale; Kimbal; Stickney and Hayward, had wagon top boilers. The Southers had "jug" or dome boilers. The Stickney and Hayward were like sketch, the Hale and Kimball had a forward dome and whistle forward on the dome. Their bells were mounted on the sand box. The cabs had swelled sides and were mostly glass. Put in there three windows besides the



The "John M. Southey"

one that opened on the running board. I have put two in the sketch. I think the Southers had square dome casings covered with corrugated iron on a square base. The old John Souther on the Manchester and Lawrence was like this, also the Gov. Ware. The list of the R. & B. engines reads just as they were told to me and I copied them from another paper. All the others except the B. & M. I copied from a book, in which I wrote them when I was a boy. The B. & M. are from a printed list. I have all the names and numbers they had when they discarded names. I have lots of names that I got in Richmond, Va. right after the war. I went there to see the R. Rds. and if you would like, later I will tell you about the whole trip. The names I have sent to you comprise most of the old wood eaters in this part of New England. Here is a road I have omitted—the Cocheco—later called the Dover and Winnepeseogee, they never owned more than three engines, at any one time, as follows:—Farmington; Rochester & Montpelier. The latter was a drop hook and came from your way. Perhaps you knew it when a boy. Later they scrapped the Farmington and bought the Alton Bay. They were insiders but the Rochester excepted. If you should ever go to Alton Bay, when the Advent Camp Meeting is running "full

blast" and their blower, on, you will hear the old Farmington's bell ringing to call their followers, to prepare for the final smash-up of all things. That is quite a step down for a bell that has travelled so many miles on the boiler of a good old locomotive. There was a new line just before the War that ran from Boston to Woonsocket, called the Boston and New York Central Railroad. They had two hard coal burners—the Marshal S. Rice and Hiram Allen. I think they were Rogers engines. My cousin fired them. At the time that the Midland R. R. had failed I saw on it one old tub named John Ruff. It had one pair of drivers and a copper fire box. That was in 1862, afterwards its road was called Boston, Hartford and Erie. There are not many who know that it was the Midland R. R. There was also a Midland of Canada. I saw one of their old kettles at Portland Locomotive Works. It was a 2-4-0 type and the forward wheels were nearly as big as the drivers. It had a crank throttle and on the quadrant it was marked open and shut at either end. It was made in Sheffield, England. The buffers between the engine and tender were made of leather filled with curled hair and hoop wire. I guess this will answer for this time. I would like to hear from you any time.

Very respectfully,

L. L. FLETCHER.

P. O. Address: West Bristol, Me.

P.S.—The Medford No. 4 B. & M. was once the Bangor. It ran into the Charles River draw and after they rebuilt it they changed the name. I remember three others that have run into the draw around Boston. Later the Medford went in for the second time.

P.S.—I have run out of paper.

North Hollis, March 16

Mr. E. R. Russell

Dear Sir:—

Yours of the 12th was received Saturday. I have read it and re-read it and am pleased with what you wrote and also with the picture of the locomotive (which I will copy and return) as I can see in it several well remembered features of the old Concord

locomotives. I will make a sketch of one of these and send it to you.

Well you wanted me to write a narrative of that trip to the South. Before entering upon it I will say that I fancy you will get all the letter you want before I lay down my pen.

In the month of February and till after the war closed, I was out of employment on account of slack times in the McKay Machine Shop at Lawrence, Mass., and I became possessed with the notion that I would like to see how the railroads looked around Richmond, Va. So one rainy Monday morning I got on the old locomotive "Newburyport" at the South Station in Lawrence with the engineer Robert Smith and fireman Isaac Horne and rode to Boston getting off at Causeway Street and entering the cars. The train was taken in from that point to Haymarket Square by horses. I remained at this station two or three hours waiting for the rain to cease. Then getting something to eat, I started on foot across the City to the Boston and Worcester Depot. There I bought a ticket for Washington and left a little after 6 P. M. I soon fell in with a man who was going to Philadelphia.

The first stop of any account was Worcester. I got off and looked around the station. I noticed a train of two cars backed in at right angles to ours and started to look over their locomotive. It was an insider named "Lancaster;" Worcester and Nashua R. R. A friction drum was working on the tire of the driving wheel forming a contrivance by which a brake was applied to the whole train.

The next point of interest was at New London on the boat for New York City. I went to the entrance of the Engine Room and watched them work her away from the pier. We got into New York about 6 A. M. and I took the ferry for Jersey City. The ferry boat landed at the station of the New Jersey R. R. and my friend and I went to the train gate, he preceding me. The gateman said to him "Your train does not go until nine o'clock!" and looking at my ticket he said "Yours goes in five minutes." So I bade my friend good bye and passed along. I looked at the last car on the track to see if it was attached to the train as I wanted to be in the rear and to look back and take in all that could be seen.

When I got to West Philadelphia, I saw two queer things—that is queer to me—in the way of locomotives. They were the first "Camel-backs" that I had seen and were named "Rich-

land" and "Pawnee." A feature that was novel to me turned up at Havre de Grace where the whole train went on the ferry boat when they were switching the train. I saw an old engineer and his fireman that used to run the "Isaac Spalding" through the town where I used to live in boyhood (Salem, N. H.) This engineer was Thomas McAlester. I learned his name by seeing it on his steam gauge light. I forgot the fireman's name but later I saw him clerking in a clothing store and still later he was a fireman on the Boston and Maine R. R. They were acting as switchmen for the new train bridge then in course of construction across the Susquehanna River and intended to supplant the ferry.

I saw lots of queer locomotives at Baltimore. The train was broken and hauled one car at a time by horses through the City over the noted route pursued by the Sixth Regiment of Massachusetts, when the mob fired on the soldiers. The locality was pointed out to me and since then I have read the description of the scene and talked with some of the soldiers.

At Annapolis Junction I saw the front end of a locomotive that had the steam pipes outside the boiler. It was like the one of which I wrote you and which you will see in Locomotive and Railway Engineering for I sent the sketch to that Journal. When I left the train at Washington, I took a look at the locomotive that brought my train. It was "Gen. Sickles" of the Balto and Ohio R. R. made by Rogers.

Everything in the hotel line near the depot was crowded but I got quarters with some teamsters in a room with three beds, I visited the Capitol in the evening.

The next morning I went to the station where I came in the day before and asked for a ticket to Richmond, Va., and was told to get it in the building across the street. Going outside I saw across the way a rough board building that once had been decorated with a coat of whitewash. Entering I saw nothing but lime casks and bags of hair. I went outside and looked around in every direction and then returned and spied a little room in one corner where some men were playing cards. They had glasses and a pitcher. (Probably filled with spring water!) "Can I get a ticket here for Richmond?" I asked. One of the men opened a desk and gave me a ticket after he had turned his stamp. He then called a colored man and said "Show this man to the train." He led the way down the street an eighth of a mile and there the train stood across the roadway with the locomotive pointed to-

ward a back alley. I forget the locomotives name—it had lots of "O's" in it. About half an hour passed before we started down the alley past hog pens and piles of stable refuse and then turned at right angles into a wide street where a halt occurred to take aboard two boys.

Soon it crossed the Potomac and stopped at the station in Alexandria. I was in the rear car. I saw at Alexandria an omnibus that had been built at Concord, N. H. Some years before this I was working in a shoe factory and saw the same omnibus going past on the train. It was named "Joseph Vanderbilt" and lettered across the top "Washington & Alexandria." On the end of the driver's box was the lettering "O. & A. R. R." (Are you getting tired? I have just got started!)

I saw a locomotive at Alexandria named "Rapidan." Next near a creek and old mill (which later I learned was Bull Run) I saw a block house and by the track I saw the tops of several hogsheads, which a man, (who used to help me in my mill) told me he had assisted in burying. They were full of brown sugar he said. Next came Manassas Junction. Only two buildings were to be seen, both of them new. One was marked "Hotel". The other looked like a freight shed. A good looking woman came out and got the mail bag. It was a flat country and the dry grass was three feet high (might take off an inch or two) I could see the old tracks and a long string of trucks that had been through fire and I could see the upper frame of a turntable and trace the grade of an old R. R. till it disappeared in a cut, I could see remains of old gun carriages strewn in the grass and on either hand as far as the eye could range the ground was cut up with rifle pits and other earth works.

Further along, the railroad ran through a stockade made of logs set upright in the ground and for some distance the track was laid on little pine sticks laid close together. I noted a section gang of fifteen men throwing the loam against the end of the ties where the rain had washed it away leaving the ties projecting over the grade. The brakeman said that just a little while before this the track tipped and sent a locomotive off. When I reached Gordonsville I saw the tender and the cab of this locomotive on the wrecking train. It looked new. At Gordonville, I changed to the Virginia Central R. R. for Richmond. The platform was thronged with darkeys carrying trays of refreshments. While we were waiting a train came in headed for Washington. The paint was so dull I could not make out the name but

I counted eleven men on the locomotive. It had been painted green. Her stack looked like this

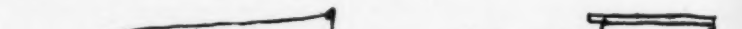
I will not attempt to describe any more scenery, for in fact there was nothing but woods till I came near Richmond. There everything showed signs of the war. When I left the train, I went into what I thought was the station and the first thing that confronted me was a bar. Rum shops on every corner. Even the toll house on Mayo's bridge was a rum shop. I should say that one-third of the people made a living by selling liquor to the other two-thirds.

First of all I began looking for a lodging place and after wandering through some deserted streets and passing through what had been in former days a market the sign "Hotel" caught my eye. When I came nearer I read over the door "Uncle Tom's Cabin." I turned into a broad street and came to an entrance with "Piedmont House" marked on a piece of tin. I climbed the much worn stairs and at the top was met by a young man to whom I explained my wants. He said "I will go and ask mother." Well mother came, I wish you could have seen her. She was hooked nosed, lantern jawed and crosseyed.

The first thing she said was "You're a Northern man ain't you?" I put on my blandest smile and owned that I was. She said she guessed she could find room for me. I met a man there who had lived in Lowell. Most of the boarders were working on a bridge for the Richmond and Petersburg R. R. The old dame had two daughters. One I think was married but neither were models of beauty. When they were not playing cards, the men and the dame were smoking. I could describe the house and furniture and the conversation but I think I can hear you say at this point that it does not savor of railroads.

Next morning after a night broken as to rest from having been compelled to listen to a cornet played by some one who was essaying the strains of "Old Zip Coon" I rose early and sallied forth to find railroads. I came to a brick passenger station and some wooden freight sheds and car house but not a car. I walked down the yard and came to the end of the track at the abutment by the river. The bridge had been burned but I could see a big Round House on the opposite side and a repair shop so I crossed the river on the Mayo Street Bridge. The foot walk was full of big holes but no toll was asked. Half way over was the toll house or groggery to which I have alluded. In front was a row of one-armed and one-legged soldiers. I could see a train of cars and a hard old locomotive just ready to start and they did before I got to them. I espied a string of coal hoppers up the yard with an engine and I made for these. The locomotive was an insider named "Carolina" and the cars were six wheelers and the roughest made things I ever saw. The truck frames were made out of old boilers. The strips were cut from the plates by punching a row of holes and left in the condition gouged out by the punch. They looked like two big kettles on a six wheel truck. I then went to the engine house and on the door a blackboard two feet by four feet lettered in white was displayed. The first line or heading was "Bellevue Hospital." Then followed "Positively no admittance without an order from Colonel Some One" and a lot of other "Someones" and signed by "General Some One". You can imagine my surprise. I could hardly believe my own eyes. I always thought I knew a Round house from a hospital. I looked back at the locomotive in the yard and at the toll house on the bridge and if I had ever drank anything stronger than water, I would have thought "I had um." If I had only seen one small snake I would have thought so any way. But I soon saw the locomotive cut loose from the train and run toward the house. The door opened and it went far enough in to get water while I went along side of it and began a tour of inspection. Twenty-four tracks led from the table which was in an open space in the center. There were all kinds of old locomotives and a lot of United States Military R. R. locomotives with no names. It was the Richmond and Danville R. R. Round house and here are the names that were in that house:—"James A Seddon," "Carolina," "Elvira," "Powhattan," "Fury," "F. W. Sims," "John Child," "Richmond," "Appomattox," "Danville," "Samuel B. Cunningham," "Banister," "Roanoke."

On the U. S. M. R. R. were Nos. "30," "31," "28," (a Taunton) "125," (a Hinkley) "25" and "336". Those numbered were all outsiders. I do not recall the builders of "30," "21," and "336". Most of the others were outsiders. The "Banister" was built at the Tredegar Iron Works, Richmond, Va., and was a stationary link like the sketch. Did you ever see one fitted up that way? I never did before or since.



I went into the shop. All the places that in former days had been occupied by benches and between the tool tables were filled with rough made bunks or cots. No work had been done since the last stages of the war when the military authorities took it for hospital purposes. In a corner was a four wheel buggy, partly complete on which one man was working. Their foundry looked as if it had been used for casting shells and there was nobody in the shop except the chap working on the buggy. In the engine house two pits and the space between was partitioned off. I thought that some fine locomotives might be stored there but learned that it was the death house where they placed the poor fellows who had died in the back shop. That is a railroad building with a history!

The Richmond and Petersburg railroad crossed the above road just North of their shop on a fifty foot fill and ended at the river. Their bridge was destroyed likewise. I saw some old scrap on the R. & P. R. R. I have a sketch before me of one that was in the ruins of their shop. I saw the "Buffalo" and "Clover Hill" both of them light Baldwins with round fire boxes. I saw a number of that style. These could not have weighed over twenty-five tons. In the Richmond and Danville round house I saw one named "New York" which in its day had belonged to the East Tennessee and Virginia R. R. It was painted in gay colors and around the name which was on the tank, as well as on the cab, there was a wreath of roses. On the Richmond and York River I saw one old style locomotive stand-

ing alone in the train shed. I was told by a returned soldier with whom I worked that the Federal Forces captured a train outside of Richmond and filled the fire box. They then started the locomotive separate from the cars and sent it toward the City. They pulled up the rails after doing this. I feel sure that the locomotive to which he referred was the one standing in the train shed as I found the track had been destroyed out as far as I investigated which was a mile and a half.

The Richmond, Fredericksburg and Potomac R. R. had some very light locomotives. These did not show signs of the war but by the side of the track I saw several boilers. That was something I could never understand, for I also saw boilers alongside the track of all these railroads. Yet they took away every piece except these boilers and left these apparently as memorials. On all the Richmond, Fredericksburg and Potomac locomotives, the cylinders and steam chests were without covers but they were finished well and kept bright and their shops were neat. Their passenger trains stood in the street with no roofing whatever for protection. All the passenger cars had a wide door in the middle of either side to allow the entrance of wounded soldiers. I went inside two of the cars that had bunks, straw being strewn on the floor. They were built at Springfield, Mass. I made a sketch of Libby Prison and it is before me as I write.

My return North was over the Richmond, Fredericksburg and Potomac R. R. and carried me past the battle ground of Fredericksburg where I saw the graves of thousands of soldiers.

Here are the locomotives that I saw on the Richmond, Fredericksburg and Potomac R. R. "Potomac" "John Sharp" "M. J. Mears" "Flash" and "J. A. Lancaster."

I saw the following on the Virginia Central R. R. "Louisa" "Southerner" "Richmond" "John Henderslaux" "Edmund Fontaine" "Virginia" and "Albermarle".

On my way home I passed through New York City and saw a number of locomotives. On the New York and New Haven R. R. I saw Nos. "40" and "41" also saw the "C. Vanderbilt" I thought I had the rest but find I tore some leaves from my memorandum book and thus have lost them.

The Western Railroad of Massachusetts named its locomotives after the States.

Let me refer now to the sketch which I made for you. It is very evident that the locomotive had been rebuilt by the Concord Railroad. I am not sure now that it did not, when I

saw it in 1860 have an outside frame. They had several of that pattern and rebuilt them as shown in the sketch, placing the half stroke pumps in front of the drivers and cut away the frames in front of the drivers. Notice the outside truck frame forward with "C. R. R." on the jaw castings. That would indicate that the railroad company built the trucks. The Amoskeag Works might have cast them with such inscriptions. All the old Concord R. R. locomotives had that broom guard forward. I heard them say that an old man split all the brooms for theirs. I never could see that they amounted to anything. A scraper would have been quite as effective. If they had been lowered so as to touch the rails, the open joints of those times would have worn them out before a single trip had been completed. Notice the hand hold cones at base of stack held on with a pin in the fashion women's hats are secured. I have drawn hundreds of sketches like this when a boy. My writing book of those days was filled with pictures of locomotives—every one I knew at that date—but when I left home, I left a lot of my little treasures in a tool chest and my uncle's children destroyed them. Among the treasures, I had three toy locomotives and nine freight cars, the locomotives carried the names "Rockingham", "Titan" and "Thornton."

In the sketch I placed the pony truck a little far back. It looks just as I have seen it waiting for its train at the station at Lawrence. I can almost hear, even now, the cinders rattling against the netting when she began to move forward. Likewise I can imagine myself standing on the platform at Salem when the locomotive came in and halted a minute and running my eyes over it and hastily sketching the outline of all the parts that I had time to catch, and the next day I would get further details. In that way I came to know the differences that existed in all these locomotives. I have most of them in mind now but I have not drawn them in thirty years. I had one fine piece of work but it was lost in a fire. It was a scale drawing 3/4" to the foot of the locomotive "General Sherman." It was done in India ink. Every bolt head was perfect and in the decorative designs even to the words "Atlant Romel" and all the battles in which the General took part. Those words were on a strip twining in and out on the tank and cab. On the pillars of all the letters there was a shield. Just imagine the work in those letters. It took weeks to draw that tender. I worked on it nights while others were asleep, for during the day I worked in the shop and

I used to measure and sketch the original at the round house on Sundays. My brother measured the parts and I did the figuring and sketched them on manilla paper copying these trial attempts into the drawing. I went into the country and took all my drawings with me in a large portfolio. I returned for a visit in the city leaving them and before my return the fire took place. There were saved my trunk, my violin and a box, but the drawings were burned and the man seemed to think they were of no account while I looked on them as the best of my life's work.

I have one or two others still unfinished. One of them I drew to send to an Art Exhibition in Boston, at a time while I was attending the State Free Drawing School at Lawrence. At the end of the first term I was awarded the highest mark and at the end of the second term, the next rank. The subject was a locomotive. The drawings I have are "diamond" stacks. One is a 4-4-0 and the other a 2-6-0 style. I have named them "Northern Light" and "Transport"—names are on the tank.

I often think of the hours I spent on the one that was burned. I worked over it nights in a cold room in a boarding house till I fell sick after it was really finished. I have written you the above to give you some idea how much interest I always took in locomotives and now I will not take up any more of your time but thanking you for the favor which you conferred in sending me that drawing, I remain yours "till ditches."

(sgd) Levi L. Fletcher.

Extract From Committee Reports and Subjects for Discussion of the Traveling Engineer's Association

36th Annual Convention, Chicago, 1928

By F. P. Roesch.

"In the first locomotives, natural or stack draft was depended upon, and therefore in the earlier locomotives, a very long stack was employed. Later on a fan at the base of the stack was tried, but soon discarded as impracticable. This was followed by a steam jet similar to our present blower and was used until George Stephenson hit on the idea of utilizing the energy of the exhaust steam to create draft."

"In the first locomotives using the cylinder exhaust jet to produce fire-box draft, the long stack was continued, the diameter being practically equal to the cylinder diameter, and this ratio obtained up to the time the diamond stack was discontinued, and designers returned to the original straight stack. In these earlier locomotives the exhaust nozzle stand was fairly high coming up to about the centre line of the boiler."

"While this design gave a free and full draft, trouble was soon encountered due to excessive discharge of cinders. The logical remedy was the application of netting in the top of the stack, but even then it was appreciated that any restriction in the free flow of the exhausted gases adversely affected the draft, and the stack was so designed that the total area of the netting opening was at least equal to, but preferably greater than, the stack area. This gave birth to the balloon stack."

"In the earlier locomotives the high nozzle stand was retained, but this affected the cylinder back pressure and it was cut down. This again, however, caused trouble, as the spread of the jet caused the outer part to impinge against the smoke-arch, and in endeavouring to overcome this difficulty, the petticoat pipe was born. History fails to record the name of the man who invented or designed it, the first mention being in Zerah Colburn's book, "The Locomotive Engine", Boston, 1851., and in an illustration of the stack and front end of a B. & O. anthracite coal-burner in the Feb. 8th. 1861 issue of 'The Engineer', the official organ of the London Institute, from which is quoted:—

"The illustration represents an anthracite coal-burning passenger locomotive as built for and at the shops of the Philadelphia and Reading Ry., U. S. A boiler of the same kind is now being made at the Ivry workshops of the Paris and Orleans Ry., with the view of the partial, if not general, adoption of American anthracite on that Line. The engine shown has 15″ cylinders, 20″ stroke, four coupled driving wheels, 5′ 6″ diameter. Weight in running order 25.2 tons or 56,450 pounds. Fire-box 7′ long inside (on the fire bars), and 3′ 6″ wide. Its sloping roof is semi-elliptic in cross section, the ordinary water level being within four inches of the top of the cylindrical portion of the boiler. The firebox is made throughout of 5/16″ iron, with the exception of the tube plate, also of iron, which is 3/8″ thick."

"Immediately over the blast pipe is placed a vertical 9″ pipe, flared outwardly at the bottom, and rising nearly to the base of the chimney. By means of this pipe, which is open both at the top and bottom, the draught due to the blast is made to draw equally, or nearly so, through all the tubes, whereas, without it, the draught tends more directly to the upper tubes."

"The chimney is 12″ diameter, and a flat plate or damper can be moved at pleasure, so as to wholly or partially close it at the top. Around it there is an outer casing to retain fine coal and cinders, a circular grating, 2′ diameter, being placed over the chimney. This grating is of cast-iron, and consists of a series of bars 1″ deep, 1/4″ thick, and 5/16″ apart. From the edge of this grating down to the outer edge of the external casing a coarse wire gauze, with three meshes to the inch, is placed.

The engine was designed and built by Mr. James Millholland, locomotive superintendent of the P. & R. Ry."

"While history apparently indicates that the balloon stack was developed on the B. & O. for use in connection with anthracite coal, yet so far as the writer can learn, its use was generally confined to wood-burners, as this design permitted the use of a very fine mesh netting without unduly restricting the effective netting opening."

"With the gradually increased use of coal as fuel, however, the balloon stack soon gave way to the diamond stack, of which there were many designs and modifications. In this development the petticoat pipe was retained. The diamond stack was followed by the straight one and extension front end. The long exten-

sions was presumably a storage place for cinders, as the earlier designs were not of the self-cleaning variety. Hoppers were provided underneath for the discharge of the accumulated cinders, and hand-holes in the sides of the smoke-arch into which crooked pokers could be inserted to poke the cinders out. The need for having the front end joints air tight was not so fully appreciated in those days, hence the cinders frequently caught fire."

A Dream of Poughkeepsie

(From the N. Y. C. Magazine for June, 1927)

Lines dedicated to Mr. Chauncey Depew, on the occasion of his 93rd birthday, which occurred on April 23rd, 1927.

I mind when a boy on the slopes of Poughkeepsie,
An engine adorned like a Romany queen.
She had rosy red wheels and a great frowning funnel,
And girdles of brass on her dark boiler green;
With turrets of bronze and an orb and an eagle,
And cylinders sheathed and shined like gold.
She was gilded and gaudy, and linked to a tender
All flowered and flared as they decked them of old.
A wood-burner grand, she was one of the beauties
That once on the route by the Palisades plied.
From the Baldwins she came in the days when Buchanan
Lived in the White House on the Potomac side.

Now sometimes, you know, I can dream I am dwelling
A boy on the slopes of Poughkeepsie again,
Where she comes by the bend of the blue stretching river,
All shining to Albany bearing her train.
Bright burnished and brazen, the red-wheeler gorgeous,
She speeds in her splendor along the green shore,
Like the engines superb of her picturesque era,
That shine on the banks of the Hudson no more.
The wood-burner grand, with her great frowning funnel,
That once on the route by the Palisades plied;
And the pride of New York in the days when Buchanan
Lived in the White House on the Potomac side.

Montreal. John Loye.

Norfolk County R. R. Office
Boston, April 21st, 1849.

Mr. Floyd:—

On Monday the 23rd inst. you will report yourself at Walpole—once at that station take charge of the trains running from that place towards Boston—you will be responsible for the safe running and will therefore examine the running gearing of the cars and see that the axle boxes are faithfully oiled and the cars scrupulously clean.

You are aware that the track is entirely new and in many places merely temporary—and without proper adjustment—you will therefore use great caution in running—and keep a constant look out for the gravel trains and other obstructions of Track—at all crossings you will be particular and have the whistle blown—bearing in mind that the signs have not been put up at the Road Crossings.

With regard to speed—you will be allowed thirty minutes from Walpole to Dedham and same time returning and in no case will it be safe to exceed twenty miles per hour or at that rate.

A Red Flag or lantern displayed in the middle of the track is a signal to stop.

A signal from the engineman to stop is a single short whistle—at which signal the Conductor and Brakeman will apply the Brakes.

Two short distinct whistles are the signal to release the Brakes.

When you desire the train stopped you will communicate the signal to the engineman by pulling the line attached to the signal bell of the engine—which line you will be careful to keep in order for use at all times—the same signal will be used to put the cars in motion when at rest.

Any disobedience of Engineman or Brakeman will be reported forthwith to the Superintendent.

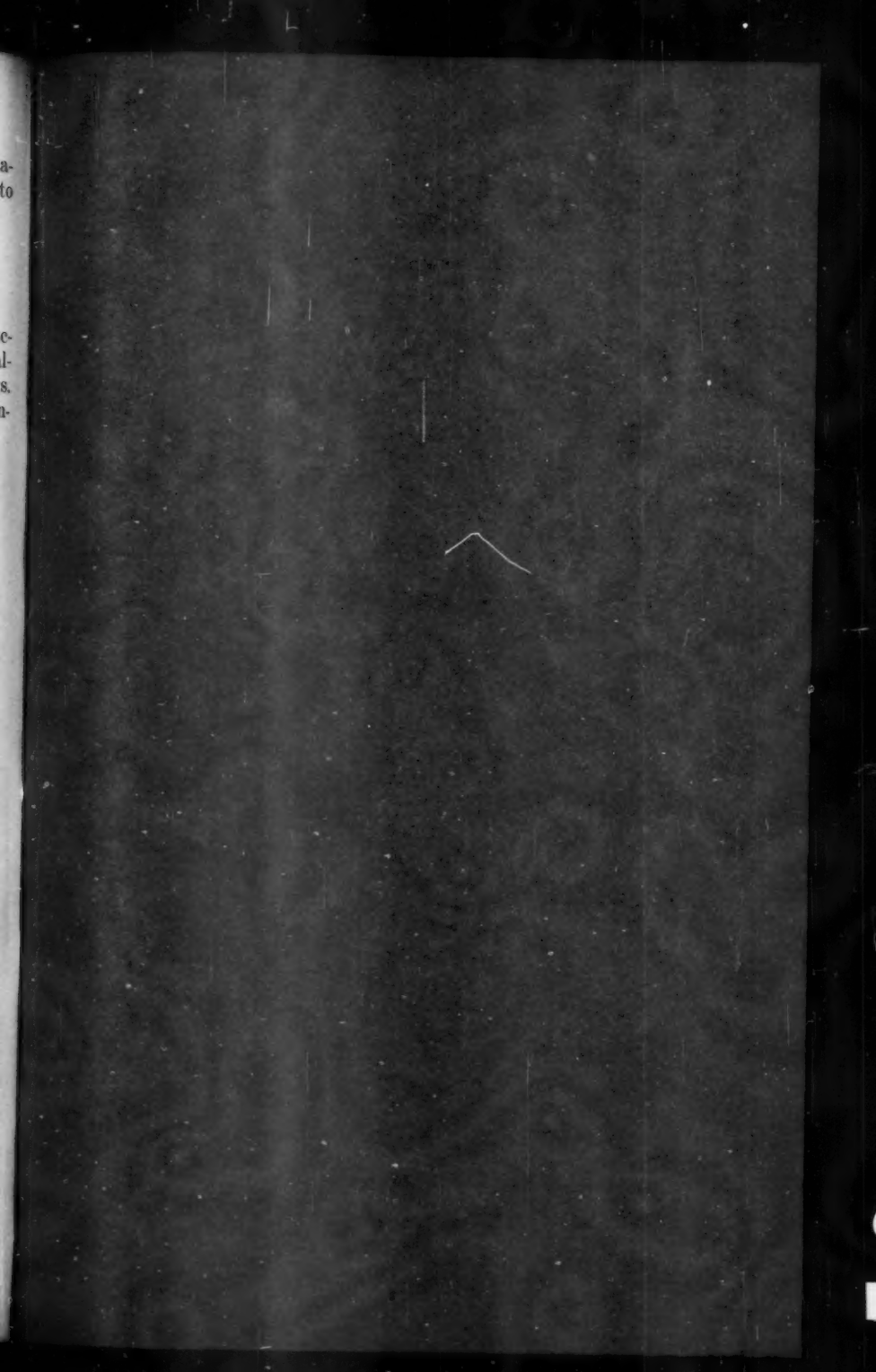
Until other arrangements are made you will sell tickets at out of town stations to Boston—at the following prices.

From Walpole to Boston _____50 cts.
From Walpole to Dedham ____25 cts.
From Walpole to S. Dedham __10 cts.
From S. Dedham to Dedham __15 cts.

Keeping a list of the number sold—to and from what stations and make daily returns of the same—with the proceeds to the Superintendent.

H. W. NELSON, *Supt.*

Further Instructions will be communicated hereafter.

Copy of original letter from Supt. H. W. Nelson to Conductor J. J. Floyd, for rules for running the FIRST train from Walpole to Dedham in 1849. Presented to the Society by Mrs. Charles C. Cline, 56 Magnolia St., Dorchester, Mass. under condition it be framed and placed on walls of Baker Library.

(Mrs. Cline is the daughter of Conductor Floyd).